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AN index to Volume XXXII of THE CHEMICAL AGE is published with this issue. It will be found inside the back cover, whence it can readily be detached for binding purposes.

Notes and Comments

Low Temperatures

A DISCUSSION was recently held by the Royal Society upon the attainment of that interesting physical state known as absolute zero. The conception of absolute zero appears to have been due to Lord Kelvin. ("Mathematical and Physical Papers," 1, 104"), and modern theory places this temperature at —273.1° C. The earliest method used to approach this temperature was that of Dewar, who, in 1898, succeeded in liquefying hydrogen (—258° C.) by the Linde method which makes use of the Joule-Kelvin effect. The gases, highly compressed, were passed through a central tube and expanded, being thereby caused to become cool through the work done by expansion. The cooled gas circulated around the outside of the tube containing the incoming gases and was then recirculated down the central tube, the compressed gas becoming progressively lower in temperature with each circulation.

By 1908 the last of the known gases, helium, had been liquefied by Kammerleigh Onnes, the inversion point having been reached by pre-cooling with hydrogen boiling under reduced pressure. The inversion temperature of helium is approaching that of absolute zero; it is of the order of 15° Abs. According to the latest published figures the boiling point of helium is —268.98° C., so that nearly 30 years ago we had reached within 4.1° of absolute zero. Keesom, at the Leiden Laboratory, made an important advance upon this work and communicated his results to "Nature" in 1926; he solidified helium at 4.2° Abs. under a pressure of 140 atmos. and was able, by allowing the solidified helium to evaporate by reduction of pressure to prolong the solidification curve to 1.1° Abs. at which it was still solid under 26 atmospheres. Since that time by the evaporation of liquid helium alone temperatures as low as 0.71° Abs. have been reached, and it appears that we have come to the limit of low temperature production by traditional methods involving the Joule-Kelvin effect.

Quite recently a method has been discovered, which was described by Professor J. C. McLennan at the Royal Society's discussion, which makes use of the cooling effect obtained under certain conditions by adiabatic demagnetisation. By using this method with potassium chrome alum, de Haas, so recently as last February, descended to a temperature of 0.0044° Abs. Apart from this, probably the lowest temperature attained to-day, two other important advances have been made, one being the Simon and Mendelssohn equipment installed at the Clarendon Laboratory, Oxford, which produces small quantities of liquid helium cheaply by a discontinuous process in which the cooling is produced by the desorption of helium gas from charcoal. The other is the method developed by Kapitza at the Royal Society's Mond Laboratory, Cambridge, which is strongly reminiscent of the Claude process and in which the gas is pre-cooled with liquid nitrogen only and is made to do external work upon an expansion engine included in the gas cycle.

A House of Chemistry

WHAT will be the outcome of the agreement recently entered into between the Chemical Society, the Society of Chemical Industry and the Institute of Chemistry? The question is of topical interest in the light of the speeches at the annual dinner of the Society of Chemical Industry at Glasgow last week, when Professor N. V. Sidgwick conveyed to the Society the greetings of the Chemical Society, of which he is president, and spoke hopefully of a gradually increasing measure of co-operation resulting from the agreement. He was careful to avoid the use of the word "co-ordination," and a little later Mr. Edwin Thompson, president of the Society of Chemical Industry, was equally guarded in not referring to "amalgamation." There are some people who perceive in the agreement little or nothing more than an arrangement for sharing the financial burden of the chemical library, but among the leaders of the three societies there is a genuine search for common ground in promoting the interests of chemistry. At all events the present agreement is more or less experimental, and is free from the danger of any one organisation acquiring a dominating advantage over the others, while it leaves the course clear for an increasing measure of co-operation if found desirable.

Mr. Thompson concluded his year of office as president of the Society of Chemical Industry with a vigorous suggestion that the much-discussed Chemistry House scheme should be brought to fruition. He was one of the guests at the opening of the French Chemistry House in Paris some months ago, and he came home with the feeling that the French had stolen a march on us. If the French can build a Chemistry House, there seems no reason why the British should not do likewise, and Mr. Thompson hinted at the possibility of a

modernised building on the site of Burlington House which might become in the fullest sense a home of science. The whole scheme has much to commend it, but it calls for exceptional qualities of leadership in those at the head of the societies concerned. We suggest that whoever is chosen to preside over the new chemical council that is to be set up under the new co-operating agreement should make a special study of the problem and seek to enlist the support of the kindred organisations in proportion to their numerical strength and professional standing. It will only be by impartial investigation along such lines that the real possibilities of the scheme will be established.

The Alkali Inspector's Report

OFFICIAL evidence of the increasing prosperity of the chemical industry is afforded by the annual report of the Chief Inspector of Alkali Works, of which we give a summary in other pages of this issue. Mr. W. A. Damon states that the favourable indications in 1933 were fully justified during 1934, and it is apparent that steady progress is being maintained. The industry, he says, has consolidated its position and is in a more healthy condition than for several years past. The erection of much new plant and the rebuilding and modernising of old plant has testified to a feeling of greater security. The new Billingham plant for the hydrogenation of coal and oil is now commencing production, and there are indications that other plants of a similar nature may be erected. The marked improvement in the artificial silk trade experienced in 1933 was maintained in the year under review and was reflected in the sulphuric acid and kindred industries. The flourishing state of the motor trade has brought about an increased demand for rubber chemicals and the inspector also notes a remarkable increase in the use of trichlorethylene for metal degreasing.

The tendency towards rationalisation and centralisation continues, and is especially marked in the tinplate trade and in the gas industry. While many of the new groupings have been prompted by financial considerations, there is no doubt that the amalgamation of undertakings makes possible more economic purchase of raw materials, improved disposal of by-products, better sales organisations and more efficient technical supervision. Renewed activity in most districts is partly offset by the poverty of certain other distressed areas such as Tyneside and Merthyr. There is no doubt that the public is more concerned than ever before about air cleanliness, both as regards pollution by smoke and by dust as well as by offensive gases. Local authorities, too, are becoming more interested and have frequently appealed to the Ministry of Health for advice and assistance in dealing with difficult problems. Manufacturers have, in most instances, realised their duties to the community in this respect and have shown every willingness to co-operate in efforts to reduce offensive emissions to a minimum.

Sulphuric Acid Tests

AN appendix to the report of the Chief Inspector of Alkali Works describes a modified method for estimating the total acidity of chamber plant escapes. The method of testing hitherto employed by district inspectors, by absorption in hydrogen peroxide, is unsatisfactory in that it does not include all the acidity due to oxides of nitrogen. Investigations in the laboratory led to the development of the modified test and district inspectors are now employing it and are testing its reliability. Should it prove satisfactory it is proposed to adopt it as the official method. Manufacturers of sulphuric acid would do well to introduce the modified method of testing at their works, either instead of or in addition to the ordinary quick test. Not only does it give a truer estimate of acidity, but it also affords an indication of the loss of nitre.

Reference is also made in the report to a paper of great interest to acid manufacturers recently read by Messrs. Price and Dooley (Chance and Hunt, Ltd.), before the Birmingham section of the Society of Chemical Industry. The paper describes experiments, carried on over a number of years, on the water washing of Gay Lussac gases and it is shown that by subjecting the gases between the Gay Lussacs to a water wash, both sulphur and nitre are conserved whilst the acidity of the escape is reduced to a very low figure. It will be remembered that both Dr. Lewis Bailey and Mr. Young had previously experimented on the water washing of Gay Lussac gases and the results of their researches have been published in previous annual reports of the Department. There are probably many manufacturers who will be glad to adopt this method. It will be of particular value where acid sets are situated in populous districts. In a general note on the chemical industry, Mr. Damon remarks that a noteworthy feature of modern chemical processes is the increased use of and reliance upon instrumental equipment and automatic recording devices for the purpose of indicating the progress of operations. Although the initial cost of providing recording instruments is, in some instances, rather heavy, it is found in the long run to be an economy. Not only is more efficient working ensured, but the risk of accident is minimised.

Colours for Industrial Use

Selecting a Reliable Source of Supply

COLOUR users, at the present time, are faced with the important question of making sure that they use the colour best suited for their manufactures. In the first place the user has to consider whether the colour is ideal for his purpose—that there is no reaction between the colour and the particular manufacture, whether the latter be ink, cellulose, paint, distemper, rubber or linoleum. Secondly, the user must consider whether the colour is all that it might be, in its power to increase sales by the brilliance and attractiveness of the manufactured product.

During recent years a larger and better range of colours has become available for nearly all users. Visiting one of the works of a London colour house this week, a representative of THE CHEMICAL AGE was able to see the methods of production which are in use, and the care which is taken to ensure that the colour user is supplied with a trouble-free product. The works visited were those of J. W. and T. A. Smith, Ltd., of Old Ford Road, London, E.3, who have really specialised in pigment colour production. It was this firm who first put on the market the "Brillfast" type of colour and who also, later on, made these concentrated colours available dispersed in stand oil, a form in which concentrated colours are more easily handled by the user. Giving special attention to the organisation of colour production, J. W. and T. A. Smith, Ltd., have works specialising in certain types of colour—for example, one works is making reds, another works is making chromes, a third works confines its attention to "Brillfast" colours, etc. It is good to realise that a private undertaking such as this has been so successful in furthering the employment of brighter and faster colours throughout the many colour-using industries.

The Institute's Charter Jubilee

Celebration Banquet at the Dorchester Hotel

Professor J. F. Thorpe, President of the Institute of Chemistry

OVER 650 guests attended the banquet held by the Institute of Chemistry in celebration of its Charter Jubilee at the Dorchester Hotel, Park Lane, London, on Tuesday evening. Professor J. F. Thorpe, president of the Institute, was in the chair, and among the principal guests were Princess Alice, Countess of Athlone, and the Earl of Athlone, Lord Ashfield, the Bishop of Birmingham, the Earl of Crawford and Balcarres, Lord Dawson of Penn, Lord Gainford, Lord Macmillan, Lord and Lady Melchett, Lord Plender, Lord Rayleigh, Lord Rutherford of Nelson, Sir Christopher and Lady Clayton, Sir Edward Crowe, Sir Henry Dale, Sir Hugh Elles, Sir Alfred Faulkner, Sir Richard and Lady Gregory, Sir Daniel Hall, Sir Harold Hartley, Sir F. Gowland Hopkins (president of the Royal Society), Sir Harry Lindsay, Sir Henry Lyons, Sir Harry McGowan, Sir David Milne-Watson, Sir Joseph Petavel, Sir William J. Pope, Sir Robert Robertson, Sir Russell Scott, Sir Frank Smith, Sir Josiah Stamp, Dr. and Mrs. E. F. Armstrong, Dr. Leslie Burgin (Parliamentary Secretary to the Board of Trade), Mr. W. A. S. Calder (president of the Society of Chemical Industry), Col. W. M. Carr (president of the Institution of Gas Engineers), Col. A. E. Davidson (president of the Institution of Mechanical Engineers), Dr. Herbert Levinstein (president of the Institution of Chemical Engineers), Professor N. V. Sidgwick (president of the Chemical Society), Professor E. C. C. Baly (president of the British Association of Chemists), and Professor William Thornton (president of the Institution of Electrical Engineers).

Early Days of the Institute

The EARL of ATHLONE proposed the toast of the Institute of Chemistry and said the banquet was being held in celebration of the fiftieth anniversary of the grant of the Royal Charter by Queen Victoria. The Institute was founded in 1877 with a nucleus of 225 members, under the presidency of Professor Edward Frankland, who then held the chair of chemistry at the Royal School of Mines, now incorporated in the Imperial College of Science and Technology. There was a feeling in some quarters at the time that the establishment of the Institute was an attempt to form a kind of trade union, which it was not, and never had been. Even the name of the Institute was a subject of contention because the pharmaceutical chemist had acquired the name chemist by statute. Professor Frankland, having started the infant Institute on its journey, handed over the presidency to Sir Frederick Abel. Sir Frederick, who had taken an active part in the early work of organisation, had the delicate duty of guiding the Institute through a period when its strength was not yet assured and the enthusiasm to which it owed its origin had in some measure cooled. Then came Professor William Odling, who was the Charter president. The membership in 1885 had reached the large number of 430, a number which did not appear very large to-day, but at that time it included nearly all the professors and teachers of chemistry, leading consultants, official chemists and chemical advisers in the country. The total number of British chemists was then very small. The pioneers had the foresight to recognise that the day would come when the pursuit of chemistry would be counted a very necessary and honourable calling, and Queen Victoria was graciously pleased to grant the Institute's petition for a Royal Charter of Incorporation. Professor Odling continued in office for five years and successfully brought the Institute through the difficult period associated with growing pains. When the war came in 1914 the Institute was recognised as the chief agency for providing chemical services for the forces and in the production of all kinds of material necessary to a country at war.

Out of evil came good and with the return of peace the scientist realised what a great scope commerce and industry offered for his services. The Fellows and Associates of the Institute now numbered over 6,300. The Institute, which celebrated the jubilee of its formation in 1927, had advanced in prestige and usefulness, and the King had been pleased to grant his patronage on the occasion of the Charter Jubilee. The Institute stood high among the professional bodies of the Empire and in the esteem of those who were able to appreciate the services of the chemist. It was not a wealthy organisation, but it lived within its income and spared a little for other good causes, while the percentage of unemployment among its members was only 2 per cent. Jointly with the Board of Education and the education departments of Scotland and Northern Ireland it participated in schemes for the award of national certificates in chemistry, and last but not least it owed much of its success to its twenty sections at home and in the overseas dominions which enabled its members to meet together and maintain their interest in the profession and in the Institute itself. May the Institute of Chemistry continue to flourish.

A Message from the King

The PRESIDENT, in responding to the toast, said that in the name of the Institute a loyal message had been sent to the King on the occasion of the Charter Jubilee, and he had received the following reply: "The King has received with much pleasure the loyal message of greetings from the Institute of Chemistry of Great Britain and Ireland who are to-day assembled to celebrate the jubilee of their Royal Charter. His Majesty thanks them sincerely and sends his congratulations on this memorable occasion, together with his best wishes for the continued prosperity of the Institute." Speaking of the presence of Princess Alice, Countess of Athlone, Professor Thorpe said he ventured to think that this nation had not yet realised the debt of gratitude it owed to Her Royal Highness's illustrious grandfather, the Prince Consort. Had he lived he felt sure he would have materially altered the conditions of industrial science in this country. It was possible that he might have induced the great Hoffmann not to accept an invitation to return to Berlin, but to have remained in this country and carry on the work of founding a school of chemistry here. Feeling that his task was insuperable, the great scientist accepted the invitation to go to Berlin, and with him went any hope at that time of our retaining the coal tar industry in this country.

The guests had been provided with a brochure which gave the history of the Institute from the pilgrim fathers down to the time of his own presidency. The remarkable feature of that booklet was that it contained no reference to Mr. R. B. Pilcher, the registrar and secretary of the Institute. No history of the Institute could possibly be complete without mentioning the name of the man who had done so much to-

wards furthering its interests. For 42 years Mr. Pilcher had given devoted service to the Institute, and he did not know of any similar period of service given by any officer of any scientific society.

During the last few weeks the Institute had come to an agreement with the other chemical societies by which a certain measure of co-operation had been attained. He would not bore the guests by going into domestic details but the position at present reminded him to some degree of an Aberdeen story of an Englishman, an Irishman and a Scotsman who agreed to meet after a long period of separation and celebrate the occasion with a dinner to which each should bring a contribution. The Englishman brought a large piece of beef, the Irishman brought a bottle of whiskey and the Scotsman brought his brother.

The PRESIDENT proposed the toast of the "Pre-Charter Fellows," probably the oldest of whom was Professor H. E. Armstrong, who was unfortunately not able to be present that evening. He left them about forty years ago. Everyone knew that Professor Armstrong dipped his pen with equal facility in the strongest vitriol and into the milk of human kindness, and, as he had reason to know himself, his bark was much worse than his bite. He coupled with the toast the name of Sir Frederick Gowland Hopkins, and he gathered from the records that Sir Frederick was weak in analytical chemistry. If that was so he had certainly made good in the intervening years, and they congratulated him most heartily upon recently receiving the Order of Merit.

The Pre-Charter Fellows

Sir F. GOWLAND HOPKINS, in responding to the toast, said chemistry was not properly organised fifty years ago, but they had since been able to see it take its proper place among the professions and attain to the dignity which was its due. It had not been his lot to practice the profession to which so many of them belonged. By devious paths he had wandered away into the academic calm and therefore felt he was not adequate as a representative of their pre-Charter Fellows. He was, however, pleased to be among so many old friends, and there were many he would have liked to see who were unable to be present. He recalled that his examination for the Associateship was of a very high standard, and the examiner was Dr. Charles Graham, who held the chair of chemical technology at the University College. He well remembered that he gave him very generous marks, unwillingly perhaps, because he was on that occasion weak in analytical chemistry. The examiner probably felt that the examination had failed to reveal what he knew to be a fact, that his chemical education at that time was inadequate. At any rate he not only gave him generous marks but a generous report. But for the fact that he attained to the Associateship at the right moment he felt sure he would never have been able to follow the career which had since given him great pleasure and more than an ordinary share of happiness.

Professor F. G. DONNAN proposed the toast of the Houses of Parliament and the Public Services and said the Institute had taken a great part in advising the Government and the legislators of the country in many of their difficult tasks. The public services of this country commanded the admiration of the wise men of all countries. The British Government was doing its best to utilise science in every shape and form. There were the Department of Scientific and Industrial Research, the Government Laboratory and other special research laboratories and many other directions in which the services of the scientist were placed at the disposal of His Majesty's Government.

The EARL of CRAWFORD and BALCARRES, in replying to the toast, said the Civil Service, though often seriously misunderstood, greatly appreciated such compliments as those paid by Professor Donnan.

Dr. LESLIE BURGIN, Parliamentary Secretary to the Board of Trade, also responded to the toast.

Professor ARTHUR SMITHELLS, a past president of the Institute, proposed the toast of the visitors, and Lord Macmillan replied. Sir Herbert Samuel, who was also down on the toast list to reply, had to leave early to return to the House of Commons.

On Wednesday evening the Fellows and Associates had a further opportunity of renewing acquaintances and meeting old friends at a reception, with dancing and a cabaret, at which there was again a large and distinguished attendance.

Chemical Notes from South Africa

Fertiliser and Feeding Stuffs Imports

ACCORDING to the latest figures available, South Africa during the first nine months of 1934 imported 131,350 tons of fertilisers, as compared with 107,957 tons in the corresponding period of 1933. During this period the imports of sulphur were only 18,432 tons, as compared with 31,392 tons in the corresponding period of 1933. The respective imports of chemically-prepared foodstuffs were 3,076 tons in 1934 and 2,918 tons in 1933.

Manufacture of Products from Maize

A company known as National Maize Products, Ltd., has been registered in Pretoria with a capital of £200,000, and it will manufacture alcohol, dry ice, liquid carbon dioxide, cattle feed, maize oil, yeast, malt extract, glycerine and other subsidiary products. The factory is to be erected at Germiston on a 9¼-acre site. It will be capable of handling at least 130,000 bags of maize a year. The founder of the company has studied many similar factories in Europe and America and has carefully surveyed the local sales position. As a result of this, the company has ordered plant to produce and market such goods on an economical basis. A market will be found for all the dry ice produced, and alcohol will be used as rectified spirits, methylated spirits, and as a constituent of blended motor fuel. The company hopes to take full advantage of the fact that many competing manufactures from overseas cannot be sold on the Rand at sufficiently low prices to oust it, owing to the high transport costs from the coast.

Pure Food Regulations

The Union Government has invited chemists to criticise the proposed amendments to the regulations concerning pure foods, drugs and disinfectants. The preliminary regulations were published for public information some time ago, and the comments received on due date as a result of this have been scrutinised by analysts and public health officials. Most of the suggestions came from manufacturers and municipal health officers. It is proposed that the amount of alkali put in cocoa for flavouring be reduced. In future, icing sugar may only include 1 per cent. of calcium phosphate and 3 per cent. of starchy matter. If these quotas are not exceeded it is not necessary to refer to them in the table of ingredients printed on the packet. The elaborate details given for the testing of "liquid germicides" seem to indicate that the Union regulations are now to be the same as those adopted by the British Ministry of Health. In most cases Rideal-Walker tests are to be applied. Due notice of the enforcement of these new regulations will be given to the interested manufacturers in all parts of the world, but it is stated that most of the concerns supplying the South African market are already complying with them.

Government Contracts

British manufacturers of chemicals who wish to do business with the Government should note that the Union Tender Board has issued the following instructions to the Government Departments. (1) That the period for which quotations shall remain firm be reduced from 90 to 45 days. (2) That where supplies required are to a Government specification and not in general use definite quantities shall be given. Where, however, supplies are such as are in everyday use by the general public, definite quantities cannot be given. That wherever possible estimated quantities providing a 10 per cent. increase or decrease be given on the tender form; in many cases, however, it will be impossible to provide any accurate estimate owing to fluctuations in demand, such as in the case of oils. In these cases the Government requirements form a very small percentage of the total consumption throughout the country, and, provided the contracts are awarded to bona-fide and reliable stockists, there is no real necessity for the provision of estimates. (3) That all tender forms shall be carefully reviewed and that where articles appear which are not in general demand these shall be deleted from the forms and purchased by tender as required. (4) That tender forms shall be scrutinised by the departments concerned before issue, and all articles subject to violent fluctuations be eliminated and purchased by tender as required.

The Address of the S.C.I. Medallist

By a Member of the Society

THE chemical world always expects a stimulating address from members of the Armstrong family, and in the Medal Lecture from Dr. E. F. Armstrong they have not been disappointed. The pioneers of the chemical industry were men of genius distinguished by a remarkable capacity for turning their hands to a variety of chemical manufactures; in this respect Dr. Armstrong follows the good old-fashioned method, devoid of the over-narrow specialisation that too great insistence upon the attainment of prodigious feats of memory for the examination room seems to impress upon chemists to-day before they ever enter industry. We who listened to Dr. Armstrong could not help feeling that the older generation who were given degrees for knowledge not greatly above our present intermediate stage had much to be thankful for; their minds were not spoilt by over-training, nor did they ever attain in their student days so vast a knowledge as to come to believe that they "knew it all."

Re-learning Our Lessons

Dr. Armstrong's review of the steps that have been taken by the chemical industry to put its house in order since the war deserve to be learnt by heart by every student who hopes one day to become a leader of industry. Too often the lessons that experience has taught one generation have been forgotten by their sons, and have had to be relearnt painfully by another generation that is also "struggling back to sanity" after one of those preventable cataclysms called war. The first thing to be done was to teach the nation from bottom to top the significance and indispensable importance of the chemical industry. That the teaching has not been in vain is shown by many signs such as the wide range of manufactures of British chemical industry and the difficulty that is now experienced by those who would import chemical plant in obtaining a permit to do so by satisfying the Import Board that it cannot be made in this country. We are building up not only a chemical industry, but a chemical plant industry—and the one is as important as the other in view of the increasing demands made upon chemical plant due to higher pressures, higher temperatures, greater rate of production and so forth. The next step was to provide a sufficiency of suitably trained chemists and chemical engineers, and in this, too, our success has been considerable though at the expense of altering the whole basis of chemical training and creating specialists in place of jacks-of-all-chemical-trades. However much we older ones may sigh for the spacious days of the craftsman and men of common-sense-cum-a-touch-of-genius, no doubt our conditions have passed away and the newer training is best suited to the newer order in industry. This newer order is shown by Dr. Armstrong's next item; individuality has been merged because we now "co-operate instead of compete with our fellow-countrymen where possible"—a reminder that the structure of industry has changed from the national to the international.

The New Spirit of Co-operation

If ever the tide of economic nationalism turns, it can hardly leave the chemical industry high-and-dry until wars shall cease. The chemical industry in throwing over individualism for co-operation is therefore building for all time, but, as the pioneers depart, those who catch the torch they throw down must have been brought to understand that absence of internal competition must never lead to a false sense of security, but that research and development must be pressed forward on a yet vaster scale. The change-over to co-operation has been marked by the complete reorganisation of industry into units of sufficient size to achieve economic production. Only in that way is it possible to take full advantage of the new spirit of co-operation and to counteract the advantages that many of those abroad possess in water-power and Government assistance. Constant research has been pursued to ensure that development never ceased.

The chemical industry has discovered the benefit of "sticking to the last." Dr. Armstrong recalled his own experience in the soap industry and described how circumstances made his company undertake upon a considerable scale such anciliary processes as printing, cardboard box manufacture, tin box making, road transport, the production of certain raw materials, and also the maintenance of an engineering and construction department upon a large scale. So long as the war continued and for a short time thereafter all these sidelines proved good, but it was soon found that it was both better and cheaper to leave the job to the experts and to buy in the open market. On the other hand, purely chemical ventures which arose from the normal occupation of soap-making proved to be so much more successful that if we interpret Dr. Armstrong's words aright they are still being operated successfully. Amongst these was the manufacture of caustic soda and silicate of soda, the manufacture of cement from spent lime, the base-exchange water softening business, the manufacture of hydrogen catalytically, the edible oil industry and activated decolourising earth, and so forth.

Perhaps one of our greatest handicaps as an industry is the fact mentioned by the lecturer that "Every chemist in industry realises as he progresses in life that sooner or later his utility *qua* chemist has reached its maximum and that for further promotion he must be able to take part in management." Unquestionably, management should be in the hands of experts at their job. The chemist should be the manager in a chemical industry, just as the engineer must be the manager of a machine shop, the printer of a printing works, and so on; but is it not something of a tragedy that so many a highly qualified chemist who could do work of untold value both to the industry and to the science should be condemned to turn away from "the road Nature has prepared for him" solely because of shortage of £.s.d. to pay him an adequate salary. Management is defined by Dr. Armstrong as "a hotch-potch of common-sense economics and science." In other words, the world still values a hotch-potch of common-sense which requires a little training and a lot of *nous* higher that a life-time of scientific experience and ability to make fundamental discoveries. It does not seem quite right; somehow the world values of human material seem to need revision.

Amelioration of Labour Conditions

The lead that the chemical industry has given in the direction of amelioration of labour conditions was deservedly stressed by Dr. Armstrong; it was "early in the field to give holidays with pay, to reduce the former long hours of work by stages to 52, then to 48, and finally 44 per week, and it is clear that the five-day week is not far off." A significant sentence was to the effect that "when the workpeople realise that the attaining of better conditions depends on their own efforts, that the granting of them is subject to the factory being able to produce at a cost which is competitive, which cost in turn depends to a greater or less degree on the attitude of labour, then the way is open to progress." Nevertheless, this method of attaining better conditions cannot in the long run take us very far, and Dr. Armstrong recognises the fact repeatedly stressed by THE CHEMICAL AGE that in the end there must be a general reduction of the hours worked per life-time, and that only in this way can humanity take advantage of the weapons for labour-less work that scientific research and invention has placed at its disposal. For a time it may be possible to keep the hours of work the same and to increase consumption, but there must be an end to that if we, as a species, are to consume and not to waste. Dr. Armstrong, like everyone else who touches this subject, is content to state the fact, but gives no hint how this desirable consummation is to be brought about. At present, technical men in general and the chemist in particular are blamed for the difficulties which have arisen because there is not sufficient common sense in the world; very rightly, Dr. Armstrong insists that "a constant flow of new industries is the most vitalising factor in modern industry, and without research there is no security in the industrial life of a modern State." Those words might have come straight from THE CHEMICAL AGE; and so also might a remark which followed close upon the one just quoted to the effect that: "It passes my comprehension why the services of the specialist consultant are so little used in this country." This neglect of the con-

sultant is properly another phase of the labour problem. With increasing specialisation one would have thought the consultant would have been in demand; but with increasing supply of trained men for the chemical industry there has arisen a feeling among the directors that if they pay a trained man an adequate salary he should be able to tackle any job without calling in a specialist. Concurrently there is a feeling among the trained men that it must involve a loss of prestige if they own that anyone can do a job that they cannot. It all comes back to the cobbler and his last. So many chemists do not know the limits of their last! If all would realise that it pays handsomely to get an expert to do an expert's job, and that the general practitioner has his own proper sphere, much money would be saved. What would the directors and staffs think if the medical profession were equally determined not to call in a specialist when in doubt?

Increasing Specialisation

Increasing specialisation even in the less skilled work seems to be the trend of the future. "Ultimately the chemical industry, with the exception of a few day labourers, will be operated by a staff of workpeople all of whom have had some technical training; these with the aid of instruments will control continuous operations." We are, however, a long way from this in some industries. What, for example, are we to make of this method of working in the colour industry where "dyes are sold in large numbers, but often in ounces rather than in hundredweights, and both intermediates and dyestuffs are made in batches often with wide intervals between two batches. Even in the laboratory, few of us would anticipate getting the best yields of pure product when carrying out a preparation from a written recipe for the first time or for a second time many months later. It is requiring a great deal of systematic work to overcome this handicap, while a particular aggregation of plant has to be adapted to making several different substances in turn."

It is to be hoped that manufacturers generally will pay particular attention to the warning that Dr. Armstrong has given them that now is the time to modernise their plant and to make preparations for the future. Cheap money has given the industrialist an opportunity which may not recur; manufacturers must be prepared to take part in the new developments that are undoubtedly coming when increasing production will cause many chemicals to drop so far in price that they can be used to a greater extent in the course of which they will assuredly displace some existing product. As has frequently been pointed out, nearly every new application of a chemical compound involves the displacement of an existing product: the most valuable researches are clearly those in which an entirely new use is found for the new product, as, for example, in many of the application of plastics—still "there is no power on earth that will stop this movement," and manufacturers must take it into account and be prepared to change their manufactures or by research to find new uses for their products to take the place of those that disappear in the whirl of competition. This, however, seems to be getting a long way from the ideal of a national industry and mutual co-operation. The fact is, of course, that the disturbances may arise from without, and that individual chemists will not discontinue research, nor will they be prevented from finding a remunerative outlet for the results of that research if opportunity arises.

Financing Development Work

Finally there are two points in the address that are deserving of particular attention. The first of these is the increasing difficulty of financing development work on new discoveries. The financier and the banks alike will have nothing to do with a plant or process what cannot be seen in operation upon a fairly large scale, and particularly is this so in the smaller industries. One could imagine a powerful corporation which would finance a research worker who has an idea likely to mature and bring to fruition a portion of the schemes that now fade out from lack of capital and opportunity. If that corporation were sufficiently strong it would take these schemes and inventions right to the factory stage and might even float the company that would operate them, thereby gaining huge profits from the successes that would more than pay for the many failures there must be. But where among the financial men shall we find such foresight and such appreciation of the possibilities of research? Dr. Armstrong is not bold enough to propose any such scheme but suggests that the problem should be investigated.

Last, but not least, do chemical manufacturers agree with Dr. Armstrong that too much emphasis is being placed on selling? "At first sight he is wrong, for of what use is a factory if the products be not sold? But, on second thoughts, the chemical industry may be a little different from others, in that its products find their uses through research not through sale talks; if the demand is insufficient, either the manufacturer must curtail his production and take up another line, or he must find ways in which the product can be used that have not been thought of by others. It all comes down to research and inventiveness and to a close collaboration between the scientific staff of the sales staff. The salesman can often make a suggestion that only the technician can put into practice.

The I.C.I. Petition

Date of Hearing Fixed

IN the Chancery Division, on Tuesday, before Mr. Justice Eve, the petition by the Imperial Chemical Industries, Ltd., for confirmation of a proposed reduction of its capital from £95,000,000 to £89,565,859 was again mentioned.

The company applied for a day to be fixed for the hearing of the petition, which is opposed by deferred shareholders. On the previous occasion it was stated that the opposition fell into two categories—irregularities alleged at the meeting and that the scheme was unfair.

His lordship said he would hear the petition immediately after the petitions in the Lena Goldfields case, which were fixed for July 22. That meant that the case would probably come on for hearing on Thursday, July 25.

Mr. Gavin Simonds, K.C., for the company, stated that the evidence in opposition had now been filed, and he expected to be able to put in his reply by the end of the week.

Mr. H. J. Wallington, K.C., for the opposing shareholders, said it would be subject to this, that he wanted to put in some evidence by deferred shareholders and a corroborative affidavit by an accountant.

Mr. Gavin Simonds stated that in the view of the company, it was most urgent that the matter should be heard this sitting. In his opinion the contentions could be disposed of in a very short time.

New Use for Ethylene Glycol

Preventing the Formation of Ice on Aircraft

THE collection of ice on aeroplanes is a difficulty which is entirely peculiar to aircraft, and one which is frequently encountered to-day when air routes require to be operated regularly. Two distinct kinds of ice deposit are experienced: clear ice, which is hard and glassy and very tenacious, often building up very quickly, and white opaque ice, granular in structure and not quite so adhesive as the first variety.

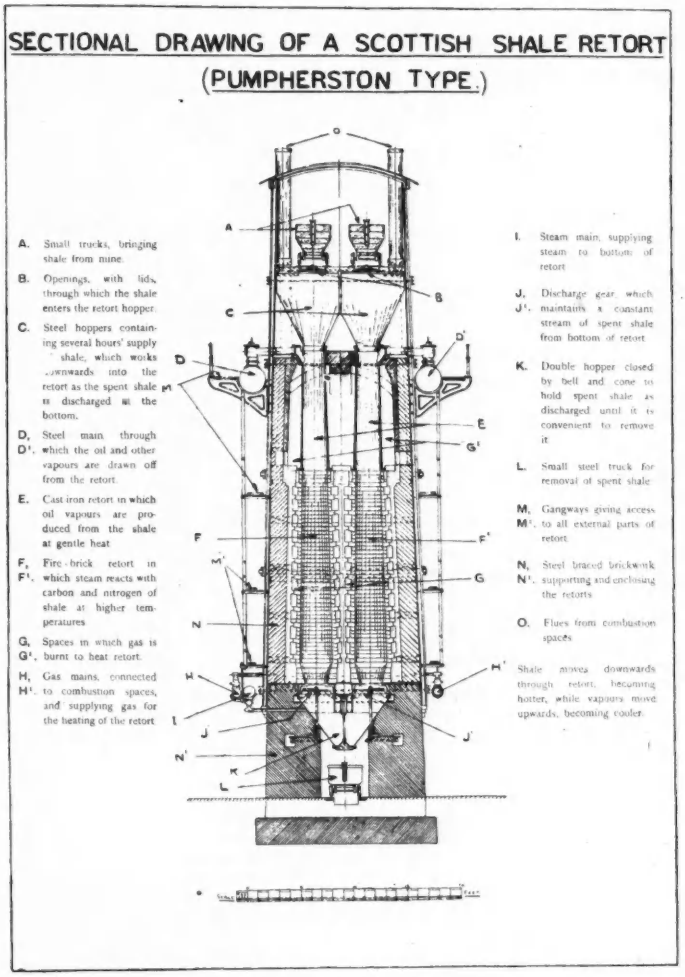
All efforts to construct leading edges of materials to which ice will not adhere have so far failed, but it is now possible to destroy the adhesion of ice artificially by liquefying an infinitesimally thin layer of ice in contact with the surface to which it is adhering, and the wind then sweeps the ice away. In applying this method the leading edges of an aeroplane are covered with porous leather to which a liquid which lowers the freezing point of water is fed continuously; adhesion is thereby destroyed by melting a small quantity of ice. A suitable liquid is ethylene glycol to which a certain percentage of ethyl alcohol is added. The addition of the ethyl alcohol lowers the temperature at which the liquid may be effectively used, by lowering both the setting point and the viscosity; it also serves as a wetting agent providing rapid wetting of the leather. Light piping carries the liquid to whichever parts of the machine require protection, and since the flow of liquid is small the system is effectively under hydrostatic pressure, and the flow at all parts is approximately uniform.

When this method is in use the ice is thawed as quickly as it forms, or its adhesion is destroyed after a few minutes, and the ice is blown away. The consumption of ethylene glycol is at the rate of 1.7 pints per hour.

The Scottish Shale Oil Industry

The Technique of its Operations

As early as the seventeenth century it was known that oil could be obtained by distilling coals and shales, but it was not until the middle of the nineteenth century that the process was put on to a regular commercial footing. By that time the need of oils for lubricating and lighting and of improvement on the materials then available for candle-making were being keenly felt, and the possibility of supplying these needs by refining natural mineral oil was investigated by James Young, a Glasgow chemist. He succeeded in obtaining the desired products from oil occurring in the Derbyshire coal measures, but the supply was too limited for a permanent industry. Assuming that the natural oil had been produced from some kind of coal by underground heat, he commenced a study of means to produce such oil artificially, and this finally led to the establishing of plant at Bathgate in 1851 to produce oil from the boghead coal or Torbanehill mineral, a very rich cannel coal which has been discovered in that district a few years earlier. In 1858, however, oil shale yielding similar products and differing mainly in the percentage of ash was discovered near Broxburn and shortly afterwards in the West Calder district. This oil shale gave only a fraction of the yield got from boghead coal, but its great abundance and cheapness permitted an expansion to an extent impossible with boghead coal, and by 1865 it is recorded that no less than 120 works were in operation using the oil shales of the Lothians or cannel shales of the coal measures.



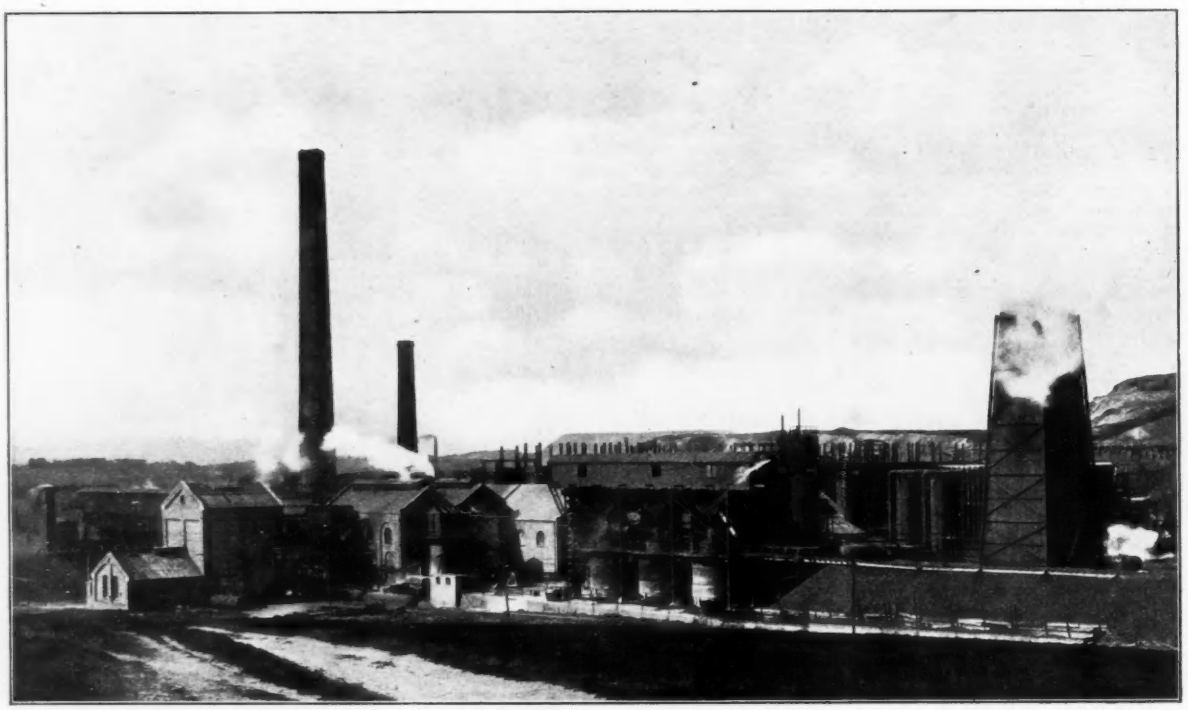
Pumpherston Shale Oil Retort.

The output of shale in Scotland reached a maximum of 3¼ million tons in 1913. During the war period a scheme for the joint marketing of certain products was brought into operation, and on the conclusion of the war this was extended to deal with all products. At the same time the six surviving companies were brought under one management, their ordinary shares being acquired by a new company, Scottish Oils, Ltd., whose ordinary capital in turn was subscribed by the Anglo-Persian Oil Co., Ltd. The economic difficulties of the subsequent period have brought about successive reductions in the scale of operations until to-day the output of shale is a little short of 1½ million tons per annum. This output is drawn from 11 shale mines, retorted in five crude oil works, and the crude products are refined in a central refinery at Pumpherston. In addition, there are two sulphuric acid works, one candle factory and a coal mine.

Deans Oil Works were rebuilt about 1895. Subsequently the plant was expanded until to-day it is the largest retorting unit in the industry, dealing with approximately 1,000 tons of shale per day. The function of crude oil works is to produce from the oil shale crude oil and scrubber naphtha, which are refined in the central refinery, and to manufacture sulphate of ammonia. They are located as near as possible to supplies of shale.

When heated to redness in the presence of steam and the absence of air, oil shale yields oil vapour, permanent gas and ammonia, and this operation is carried out in the vertical retorts. The retorts in use at Deans are all of the Pumpherston type, patented in 1894. This is a vertical retort, 43 ft. 6 in. high, circular in section, 2 ft. in diameter at the top and tapering outwards to 2 ft. 9 in. diameter at the bottom. Four such retorts are incuded in one set, 13 sets in a bench; at Deans works there are six benches, making a total of 312 retorts in all. The charge of shale rests on a cast iron table at the bottom of the fire-brick portion, and on this table rotates an arm which pushes the spent shale over the edge of the table into the hopper below. The retort itself holds about four tons of shale and any given portion takes about twenty-four hours to pass through. It is heated by permanent gas obtained in the process, augmented when necessary by producer coal gas, each set of four retorts being heated separately.

Shale as it comes from the mine is in pieces too large for the retorts and it is reduced to suitable size by heavy toothed rollers, or "breakers." The shale is fed into the hoppers at the rate of four tons per day and passes down through the retort slowly into the spent shale hopper below. In its passage the shale is gradually heated to a maximum temperature of 1,300° F., the temperature in the combustion space around the retort at this stage being approximately 1,800° F. As the shale passes downwards through the retort, oil vapour is given off at comparatively low temperatures, 650° F. to 900° F., but as the shale reaches its maximum temperature the steam passing up the retort converts into ammonia 90 per cent. of the nitrogen in the shale recoverable as ammonia. Steam, 90 to 100 gal. per ton of shale, is introduced into the retorts at the spent shale hopper, its main purposes being to cool the spent shale, to convert the nitrogen of the shale into ammonia and the fixed carbon into water gas, to remove rapidly the oil vapour when formed, thereby preventing overheating or cracking of the oil, to distribute the heat evenly



Deans Crude Oil Works.

throughout the retort, and to seal the retort against inward leakage of air through the discharge hopper.

The mixture of oil vapour, ammonia, steam and permanent gas is drawn by exhausters from the top of each retort to a bank of atmospheric condensers where oil and water condense, the latter dissolving ammonia; the mixture of oil and ammonia liquor passes through separators to the respective storage tanks, and the uncondensed gas passes on for further treatment. The spent shale is removed from the spent shale hopper periodically, and conveyed by endless rope haulage to the spent shale bing.

The gas leaving the condensers contains from 5 to 10 per cent. of the total ammonia produced and also approximately 3 gal. of naphtha per ton of shale retorted. The ammonia is first removed from the gas by scrubbing with water, and then the naphtha by absorption in gas oil. The dry gas is then returned to the retorts for heating purposes. The absorption towers for ammonia and naphtha are of the same design, approximately 35 feet high and 8 feet diameter, and are packed with wooden grids. The gas passes up through the towers and the absorbing liquid flows down over the wood packing, removing the ammonia and naphtha respectively from the gas.

The naphtha is stripped from the gas oil by a steam distillation carried out in a vertical still fitted with trays and bubble caps. The loaded gas oil enters at the top of the still, and as it descends from tray to tray, steam injected at the bottom of the still passes upwards removing the naphtha, which is then condensed, separated from the water and run to storage. The stripped gas oil leaving the bottom of the still is cooled and recirculated. Crude oil and crude naphtha are transferred in railway tanks to the central refinery at Pumpherston, where they are refined into marketable products.

Pumpherston Oil Refinery

Pumpherston Works were erected in 1883 to retort oil shale mined in Pumpherston estate and refine the crude oil obtained therefrom. As operations expanded, the refinery was extended to deal with crude oil obtained from various other retorting plants owned by the company, such as that at Deans. Since 1925, when the mines were closed and retorting was discontinued, Pumpherston has acted wholly as a refinery, and to-day deals with crude oil and naphtha from five crude oil works. Crude oil and scrubber naphtha enter the refinery separately, and at one time were converted into a wide range of products. With changed markets, however, attention is now concentrated on motor spirit, solvent naphthas, burning oils and paraffin wax.

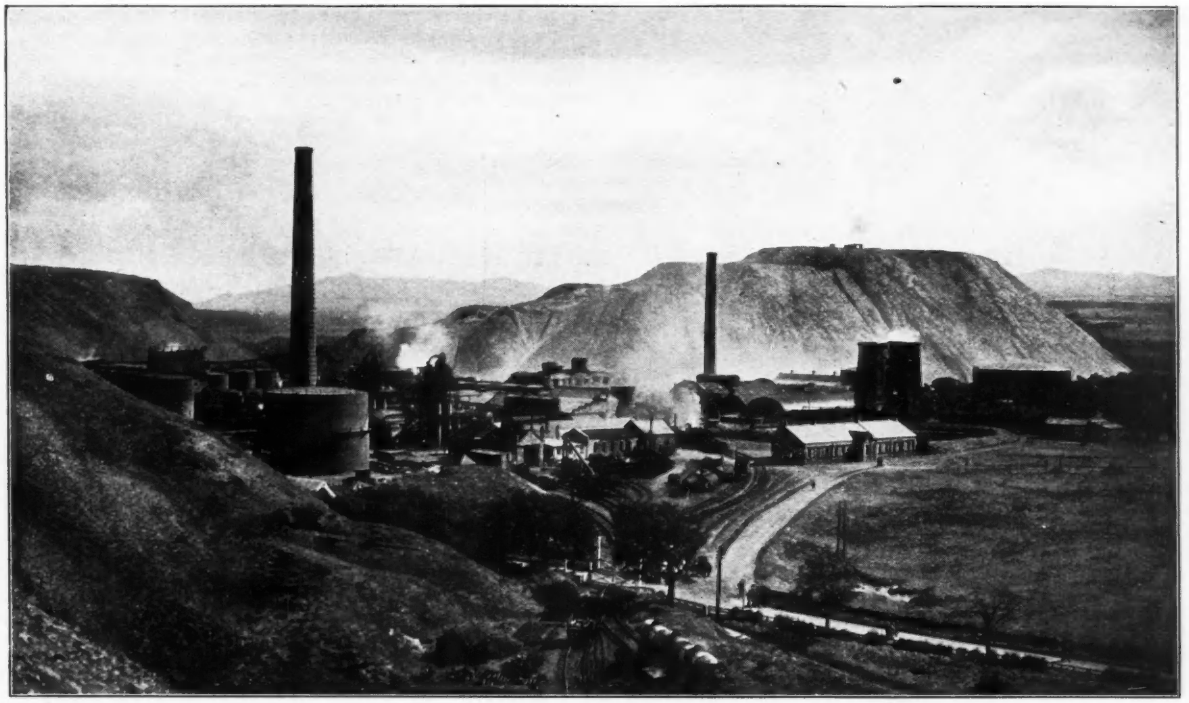
Shale oil differs from average crude petroleum in many respects, particularly in that it contains a greater proportion of unsaturated hydrocarbons, comparatively large quantities of nitrogen bases of the pyridine and quinoline type, and an appreciable amount of phenolic bodies. The presence of these constituents results in greater refining losses than are usual in refining crude petroleum. Generally, refining is achieved by (1) separation of the various components by distillation, (2) purification by chemical treatment, and (3) extraction and refining of paraffin wax.

For motor spirit from scrubber naphtha—straight-run spirit—the crude scrubber naphtha is treated in batch washers, first with sulphuric acid (sp. gr. 1.84) and then with caustic soda solution (30 per cent. NaOH). The treated naphtha is divided into two portions, one for the manufacture of straight-run motor spirit, and the other for the production of solvent naphthas. The major portion of the treated naphtha is distilled continuously in a pipe still and bubble tower unit, giving as distillate water-white straight-run spirit and a residue which is returned to process. The distillate is then treated with sodium plumbite solution which is applied by drawing the spirit and reagent into the suction of a centrifugal pump in the desired proportions, where mixing of the two takes place. The mixture is discharged into a settling tank where the product and spent reagent separate by gravity. Finally, after washing with water the spirit is transferred to stock tanks.

Four Grades of Solvent Naphtha

The second part of the treated scrubber naphtha, together with the treated heavy naphtha from the first distillation of the crude oil, is the basis of the solvent naphthas, four grades of which are prepared by distillation of the above in cylindrical stills, heated by closed and open steam. The different naphthas are simply different cuts taken during this distillation and vary mainly in specific gravity and distillation range. These shale naphthas, owing to their chemical composition, are valuable solvents and are particularly suitable for use in rubber and linoleum manufacture.

After the extraction of wax the oils heavier than burning oil are subjected to a thermal treatment—cracking—whereby they are split up into pressure distillate—crude cracked spirit—fuel oil and gas. The pressure distillate is treated with acid and caustic soda to remove or polymerise colour and



Pumpherston Oil Refinery.

gum-forming bodies. This treatment is given by continuous pump-orifice washing, the principle of which is the same as the pump washing already described, with the addition that in the pump discharge line there is a large number of nozzles, causing the spirit and reagent to change direction frequently at high velocity through mutually impinging jets, thereby ensuring intimate contact. The treatment is made continuous by allowing the treated spirit from the separator to flow into a surge tank which feeds the next treatment pump. The treated pressure distillate is re-distilled and finished by light sodium plumbite treatment in exactly the same manner as the straight-run spirit. The finished cracked spirit is water-white, of good odour and perfectly stable both as regards colour and gum formation on prolonged storage.

The first step in refining crude shale oil is distillation to coke, splitting the crude oil into (1) heavy naphtha; (2) crude distillate (approximately 90 to 95 per cent. of the crude oil) for further treatment; (3) shale resin, obtained just prior to coking and sold for use in laying paving blocks, etc.; (4) coke, containing less than 0.5 per cent. of mineral matter, and particularly suitable for making the best class of electrodes for electric furnaces.

Distillation is carried out in a bench of five boiler stills of approximately 6,000 gal. capacity, together with a range of 28 coking stills, each of 2,000 gal. capacity. The boiler stills run continuously, the crude oil being fed into the centre boiler and the residue drawn off by gravity to the two stills on each side arranged in series. The residue from the two outside boilers feeds the coking stills in rotation, where the distillation is taken to dryness. Steam is injected into all the stills, and serves the double purpose of checking decomposition and preventing the deposition of carbon in the boiler by maintaining the contents in a state of turbulence.

Treatment of Crude Distillate

The crude distillate is treated with sulphuric acid and caustic soda solution and again distilled to coke in a bench of boiler and coking stills in practically the same manner as the first distillation. The only difference is that slightly before the coking stage steam is cut off, to effect a partial cracking of the amorphous wax, leaving the total wax distillate more crystalline and therefore more easily handled in subsequent operations.

This second distillation yields (1) crude burning oil, (2) heavy oil containing solid paraffin, and (3) coke (an excellent household fuel).

The crude burning oil is further refined by treatment with sulphuric acid and caustic soda solution, and then distilled in a bench of boiler stills working continuously. Seven grades of burning oil are made, differing in distillation range, flash point and specific gravity to suit different purposes, *e.g.*, domestic and power use, lighthouses, railway signals and naval and military requirements. Gas oil is produced by distilling the residue obtained in the burning oil distillation, the gas oil being taken off as a distillate.

The heavy oil and paraffin fraction from the second distillation contains all the paraffin wax. This is extracted by cooling the oil to 25/30° F. and filtering through a standard plate and frame filter press at this temperature. The coolers in use are specially designed double pipe coolers, the cooling medium flowing between the external and internal tubes, while the internal tubes, carrying the wax and oil, are fitted with scrapers. The cooling medium is liquid ammonia injected into the space between the external and internal tubes; as the pressure is reduced the ammonia resumes the gaseous state, and in doing so absorbs heat which must necessarily be extracted from the heavy oil and paraffin, thereby cooling it to the desired temperature. The gaseous ammonia passes out and is again liquefied, cooled and re-circulated. The heavy oil, when thus freed of wax, forms the major portion of the cracking stock.

Paraffin Wax Sweating Operation

The crude wax retained in the filter presses is removed from the plates, wrapped in canvas and subjected to a pressure of one ton per sq. inch in hydraulic presses, where most of the remaining oil is squeezed out. The crude wax is then partially purified and separated into various grades of different melting points by "sweating." This process is carried out in steel trays arranged in tiers inside a "sweating house." The trays have false bottoms made of plaited hoop iron and are filled up to this level with cold water. Melted wax is run in and allowed to cool, the water is then run off, leaving a cake of solid wax resting on the false bottom.

The doors of the "sweating house" are then shut and the temperature gradually raised by means of closed steam pipes. As the temperature rises, coloured oil oozes from the slab of wax through the false bottom and is run to receivers, leaving in the trays a porous mass of wax whiter and of higher melting point. When the wax has reached the desired melting point the temperature of the house is

quickly raised, the wax melted and run off. By sweating and re-sweating the wax is sub-divided into its various grades of melting point ranging from 100° F. to 130° F.

The wax is finely decolorised by filtering hot through a column of fuller's earth and run into casting trays to cool. The solid wax is later removed from the trays and packed in boxes or bags ready for the market or for candle making.

The spent fuller's earth contains up to 30 per cent. of wax, which is extracted by solvent naphtha in a plant similar in principle to the well-known laboratory Soxhlet apparatus. Thereafter the fuller's earth is reactivated for further use by heating to a temperature of 900° F. in a rotary furnace. All the gas evolved during the various distillations is collected and used as fuel, the spirit content being first removed by absorption in gas oil and the naphtha so obtained added to the crude scrubber naphtha for refining.

Capital and Revenue Expenditure in the Chemical Trades

By S. HOWARD WITHEY, F.C.I.

At the present time many firms engaged in the chemical and allied trades are faced with difficulties in their attempts to reconcile the cost accounts with the final figures relating to the 1934-35 financial year, and the general position in this respect is undoubtedly aggravated by the lack of uniformity in the methods adopted for the recording of expenditure of a capital nature. Unless a proper distinction has been drawn in the books of account between items of capital outlay and expenditure to be charged against the periodical profits, the entire book-keeping may be rendered useless for any practical purpose. This being the case, a brief consideration of some of the basic principles that govern a discrimination between the two classes of expenditure cannot fail to be of general interest to executives and the administrative staff.

Two Recording Systems

The amount of capital invested in chemical plant is very considerable, and the annual losses due to wear and tear, corrosion, obsolescence and excessive use call for something more than casual treatment in the cost and financial accounts. Broadly speaking, there are two methods of recording the cost of acquisition of units or layouts, *viz.*, the cash book method and the purchases book method, but, whichever method is adopted, the amounts should appear as debit items in the particular asset account and should show the folio on which the original transactions are entered in the subsidiary book. If no provision is made in the purchases book for the collection of the capital outlay for posting purposes no entry will pass through the books until such time as payment has been effected, when the amount remitted to the suppliers or purchasing agent will be recorded on the credit side of the general cash book, or in the cash payments book, as the case may be, with the date and the name of the account to be debited. When the invoiced cost prices of plant and other profit-earning assets are extended into a separate column or section of the purchases book it is usually found necessary to dissect the monthly totals in order to determine the correct figures to be transferred to the debit side of several asset accounts opened in the private ledger.

In addition to the first or original cost of acquisition, the installation expenses and any foundation charges should be debited to capital account, these amounts being posted from the cash book in the usual way. Transportation or carriage charges incurred up to the arrival of plant or machinery at the works may also be capitalised, as such payments have the effect of increasing the cost to the buyer, and in those instances where it is found necessary to make adjustments or carry out repairs to second-hand units in order to ensure immediate efficiency in a specific process the full cost of such adjustments or repairs, including a proportion of the wages paid to employees engaged in the operations, should be debited to the asset account. Ordinary repairs and upkeep costs, however, must be treated as a charge against the current year's profits, these amounts being debited to a repairs and renewals account, the final balance of which will be transferred to the periodical profit and loss account. In addition to the amount required to write off the book value of a displaced asset, the revenue should be charged with an adequate amount to cover depreciation of the effective equipment.

The cost of acquiring outbuildings of any description should be regarded as capital expenditure to be spread over the period of service or useful life, and the same applies to the cost of purchasing freehold or leasehold property. If any legal expenses are incurred in connection with the transfer, the items of expenditure may be posted from the cash book, or from the purchases journal, direct to the debit side of the asset account, but these expenses should be charged against the profits as soon as it is possible or desirable to do so. Ground rent is a proper charge against revenue, and in the case of leasehold property a sufficient sum should be charged against each year's profits to provide for the effluxion of the lease due to lapse of time. Repairs to freehold or leasehold property should be shown in a separate nominal account and not merged with the figures representing plant, machinery and general repairs, and, where no sum is charged against profits under this heading, no difficulty will be experienced in obtaining an allowance equal to the value of the gross assessment under Schedule " A " when computing the balance of the taxable profit under Schedule " D " of the income tax. When property repairs are charged against the revenue, the net assessment will be allowed by the income tax authorities instead of the gross assessment. The cost of improving or extending the works or other business premises is a capital charge, including the wages paid to employees, the annual profit and loss account being debited with the repairs and maintenance costs and depreciation.

While the amount paid for the purchase of a patent medicine may be treated as capital outlay, including the expenditure involved during the first few years by a firm formed to exploit a patent medicine, all future advertising costs should be charged against revenue. In the matter of goodwill, although the original payment constitutes a legitimate capital charge, the intangible nature of this asset often renders it a troublesome item to deal with in the books and annual accounts. The method favoured by the author consists of allowing the original capital cost to appear on the assets side of each year's balance sheet, and to show the total sum provided to date for the writing down of the amount, the actual position being then clearly defined.

Forming a Company

Expenses incurred in the formation of a limited liability company may be debited to capital account and spread over a number of years, although such expenses are not really of a capital nature. Such expenses comprise the cost of preparing and of advertising and circulating the prospectus; the cost of drawing up and printing the company's memorandum and the articles of association; the deed stamp duties on each of these documents; the duty payable on the amount of the company's authorised or nominal capital; fees payable on the filing of the various documents; all legal expenses incurred up to the time of the allotment of shares or the issue of the share certificates; the accountancy and book-keeping expenses involved in the formation of the company; and the amount of any broker's or underwriter's commission. In those cases where the preliminary expenses are not paid by the promoters or by the vendor, the expenses should be authorised by the company's memorandum and shown on the debit side of a separate preliminary expenses account as direct postings from the cash book. Although the entire balance of this account need not be transferred to profit and loss at the end of the first year, the amount should be written off as speedily as possible, preferably in the form of equal annual instalments. If, upon making up the final figures, any balance is shown to the credit of forfeited shares account, or of share premiums account, this balance may be transferred to the credit side of the preliminary expenses account in reduction of the amount to be charged against revenue under that heading.

The amount representing discount on the debentures issued by a company should be debited to profit and loss over a number of years. In other words, the amount should be capitalised for the time being and a proportion written off at the close of each year's operations.

Bore-hole Water Supplies

Avoiding Troubles with a Submersible Motor Pump

THE demand for water enters largely into all manufacturing businesses. Systems of compressed air, rod-pumps and the like have previously dealt with the problem, but with comparatively low efficiency. It has remained for the introduction of an electric motor which could be combined with a centrifugal pump, small enough to go down a bore hole, to effect the most economical way of pumping from the water level to the surface.

Some years ago a company, known as Submersible Motors, Ltd., introduced the combination of an electric motor and pump, which worked equally well above or below water, and in which the water flowed through the internal portions, thereby cooling the windings and allowing for a high capacity rating. This pump, however, was not small enough in dimensions to be of use in a bore hole, but Mr. T. L. Reed Cooper, who was connected with that company from its early days, introduced a design of suitable dimensions to be suspended at the lower part of the delivery pipe in a bore hole and thereby deliver the water to the surface without any gear being necessary from the pump to the surface level. The headpiece is arranged in a manhole from which the pump is suspended (upper part of Fig. 1), and a cover is provided over the manhole at ground level.

These pumps are now made in sizes suitable for working in bore holes ranging from 6 to 20 inches diameter, and are very easily erected and set to work. The cable is brought up to the controlling switch which is arranged wherever required, or if necessary the pump can be automatically controlled to maintain a constant supply in a reservoir or pressure in a pressure tank on the surface for maintaining a pressure supply in the pipes through the works. The nature of this arrangement is shown in Fig. 1; the motor being at the bottom is always submerged, and the pump sucks its water through the motor and delivers it up through the headpiece and bend on the surface.

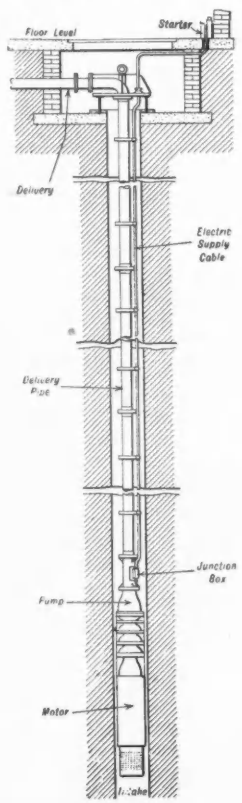


Fig 1. Diagram showing General Arrangement of a Borehole with Electromersible Pumping Equipment. The headpiece is located in a manhole at ground level.

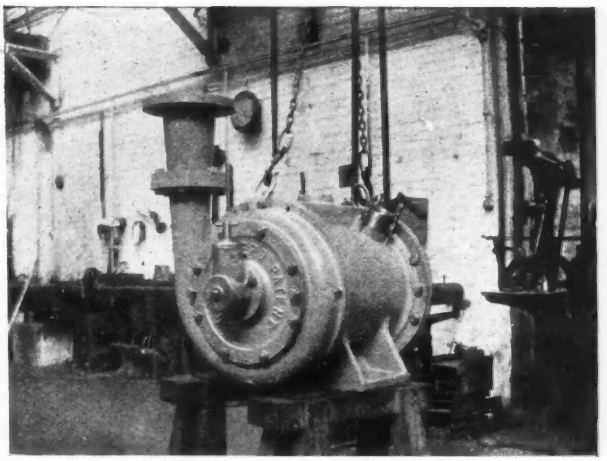


Fig 2. Submersible single-stage Salvage Pump, 4 inch delivery, as used for H.M. Navy.

Three such pumps have been installed in the North Metropolitan Electric Supply Power Stations (Fig. 3). There is another in a 14-inch bore hole at the Fleetwood Works of Imperial Chemical Industries, Ltd., where it delivers 50,000 gal. per hour against a total head of 160 feet.

The pumps have actually been developed from many years' experience of the salvage type (Fig. 2); it is owing to this extensive experience that a reliable motor has been developed for working in water, and the benefit so obtained for coupling it direct to the pump or work it has to do, thereby giving high efficiency and a good power factor.

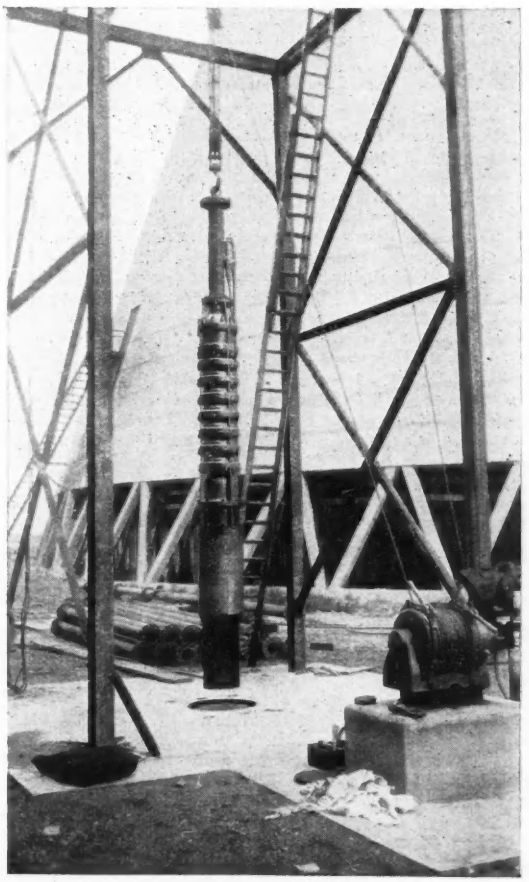


Fig 3. Lowering Electromersible Pump into 16inch boreholes at Brimsdown Power Station. Suspension delivery pipes can be seen lying in the background.

The pumps are now made at Southall by Electromersible Motors and Pumps, Ltd., who took over the business of the old Submersible Motors company and combined it with the patents of Mr. T. L. Reed Cooper. Their principal advantages are (1) saving in capital outlay; (2) ease of erection by simply hanging down the bore hole; (3) ease of withdrawal for examination and replacement; (4) low cost of maintenance in view of the above; (5) pump and motor being in a constantly submerged position is self-priming; (6) no foot valve is needed; (7) there are no glands or packings to keep tight; (8) motor and pump are so combined in one casing that they cannot be put out of alignment; (9) the space occupied is small; and (10) the pumps give high efficiency and power factor.

Owing to there being no necessity for perfect alignment of the rising main from the pump in the bore hole it is immaterial whether the bore hole is straight, vertical or crooked so long as the pump can be passed down through any such irregularity in the bore.

In London the present water level is tending to fall, owing to the numerous demands upon it, but in the country water is available at reasonable and easy depths for pumping in this way, and 12-inch bore holes are easily yielding 15,000 gal. per hour from depths of 200 to 300 feet with pumps of this description. With the ease of obtaining cheap power from the grid system, electric-driven pumps should find a large field open for them and good water easily obtainable from deep wells or bore holes.

National Physical Laboratory

Annual Visit of Inspection

ON the occasion of the annual inspection of the National Physical Laboratory by the General Board some 2,000 scientists from all parts of Great Britain met at Teddington to review the work of the Laboratory and the advances made during the year. The visitors were received in the immense hall which houses the million-volt electrical plant, Sir F. Gowland Hopkins, chairman of the general board, Lord Rayleigh, chairman of the executive committee, and Sir Joseph Petavel, the director of the Laboratory, being present Special exhibits were staged in the various departments, and the Laboratory was entirely thrown open to the visitors.

Recently the Laboratory has constructed apparatus for finding radium when small quantities are lost at hospitals and elsewhere. This apparatus when in the neighbourhood of radium makes a "clucking" noise; as it approaches more closely to the radium the "clucks" become more and more frequent. Actually each "cluck" is due to radiation from the radium striking a neon lamp and ionising the gas within it. The resulting instantaneous change of electrical conductivity of the gas is made to actuate a loudspeaker.

Exhibits of New Apparatus

A dew-point apparatus of the flat disc type, suitable for use at temperatures below 0° C., was exhibited. The disc is of chromium-plated silver, and the cooling medium is paraffin oil, previously cooled by means of solid carbon dioxide. The dew-point temperature is observed by a thermocouple in contact with the metallic disc on which the dew is deposited.

Apparatus originally designed for measuring the viscosity of refrigerants at temperatures from −15° C. to +20° C. has now been adapted for tests on brines used in refrigeration work. It is of the falling-plug type, and it has been necessary to avoid the use of metals which would be corroded by strong calcium chloride solutions.

A new colorimeter of simple construction, which contains no rotating parts, was also exhibited. In this Donaldson colorimeter coloured filters illuminated by a gas-filled lamp constitute the matching stimuli. A diffusing sphere effects the mixing of the stimuli by repeated internal reflections, whilst the variations of intensity of the stimuli are controlled by sliding shutters.

Electron Diffraction

In the past, a number of industrial problems have been solved at the Laboratory by investigations of the structure of crystalline materials by X-rays. An extension of this type of investigation has now been made possible by the installation of apparatus for examining the structure by means of electrons. The apparatus consists, in principle, of a source of electrons, a suitable holder for the specimen, and a camera which records the angles at which the electrons leave the specimen. From the distribution of the diffracted electrons information about the arrangement and spacing of the atoms in the specimen is obtained. The particular utility of this new method of examination lies in the fact that the electrons, unlike X-rays, only penetrate very short distances into the specimen, and consequently give information directly about the surface layers of the material.

In view of the need for rational design in pipe-line fittings to withstand the higher temperatures and pressures now considered of economic importance in power plant, etc., the Laboratory is carrying out a programme of research on pipe flanges which entails the study of the conditions for maintaining tightness in flanged joints under pressure at air temperature, the behaviour of flanges under high temperatures and pressures, and the creep of stud bolts.

For the high-temperature tests the equipment consists of two lengths of 8-in. steam pipe which are provided with the test flanges. These are bolted together, the joint being made with asbestos-type or metallic gaskets as required. The assembly is heated electrically to 1,000° F. and steam from an electrically-heated boiler is admitted, the pressure being brought up to 1,400 lb. per sq. in. Lower temperatures and higher pressures can be used as required. Arrangements are made to measure the deformation of the flanges at the bolt circle and the creep of the bolts during the progress of a test under steam, which is continued until leakage occurs.

Magnesium Alloys

Magnesium alloys are being intensively investigated in the metallurgy. department. The object is to develop light alloys stronger than those at present available, for use both at ordinary and elevated temperatures. For instance, there is a demand among aircraft constructors for improved magnesium alloys.

Particular attention is being given to discover metals which are soluble in solid magnesium and which are more soluble at elevated than at ordinary temperatures, so that the strength of the alloys can be improved by heat treatment. This involves the study of microstructure and constitution, as well as of rolling and mechanical properties. This work is made more difficult because many magnesium alloys cannot readily be forged and rolled. For this reason it has been necessary to evolve methods of hot-working the cast metal. Special attention has been given to the effect of slow pressing and it has been found possible to work alloys by this means which are difficult or impossible to roll satisfactorily. In some cases, material which has first been pressed can then be rolled more easily. In this connection a new experimental mill for slow-speed rolling has been installed, purchased from a bequest by the late Mr. J. G. Gordan.

CHEMICAL fertilisers used by the many large rubber, tobacco, palm oil, tea, and fibre plantations are the greatest items on the list of chemcals imported into the Medan region. Thousands of acres occupied by these plantations require an ever-increasing amount of fertiliser, and the use of chemical fertilisers has increased steadily as the soil has become exhausted. About 20,000 metric tons of these fertilisers were imported into the East Coast of Sumatra during 1934, made up of the following: potassium salts, 120 metric tons; superphosphates and double superphosphates, 774; ammonium sulphate, 10,165; and other materials, 8,896 tons. Netherlands and Germany are the principal suppliers.

Fume Emission Troubles at Alkali Works

Annual Report of the Chief Inspector for 1934

THE 71st annual report on alkali, etc., works (H.M. Stationery Office, 9d. net) states that the number of works registered in 1934 was 918, involving the operation of 1,759 separate processes. There was an increase since last year of 17 in the number of works and of 43 in the number of processes. This year is the first since 1917 that the number of works registered has shown an increase over that of the previous year. The decline in the number of sulphate of ammonia plants at work appears to have been arrested, whilst there has again been a substantial increase in the number of benzene plants.

During the year a draft Order was prepared by which it is proposed to add to the list of noxious or offensive gases: (1) Fumes containing silicon, calcium or their compounds; (2) fumes from paraffin oil works containing any sulphur compound. It is proposed further to extend the list of scheduled works to include "cement production works" (under a new definition) and to widen the definitions of muriatic acid works, or works (not being alkali works as defined in this Act) where muriatic acid gas is evolved either during the preparation of liquid muriatic acid or for use in any manufacturing process or as the result of the use of chlorides in a chemical process, bisulphide of carbon works and paraffin oil works. The proposal to make this Order (Statutory Rules and Orders, 1935, No. 162) has been widely advertised, the interests concerned have been consulted and a public inquiry has been held in accordance with the requirements of the Act of 1926.

In view of the tendency to extract carbon disulphide from benzol recovered at gasworks and coke ovens, an investigation was carried out in the Chief Inspector's laboratory to elucidate the nature of the reactions involved in the decomposition of alkaline and neutral methyl xanthates, and the work done is detailed in an appendix to the report. Another laboratory investigation has confirmed that the standard method of estimating acidity of the escapes from sulphuric acid works does not include all the acidity due to oxides of nitrogen.

Increasing Prosperity of Chemical Trade

In the report for 1933 extracts were quoted from the district reports, all of which indicated increasing prosperity of the chemical trade. Such indications, states the Chief Inspector, have been fully justified during 1934 and it is apparent that steady progress is being maintained. The industry has now consolidated its position and is in a more healthy condition than for several years past. A feeling of greater security has manifested itself in the erection of much new plant and the rebuilding and modernising of old plant. Particularly is this so in the case of the coking industry. The large plant owned by Imperial Chemical Industries, Ltd., at Billingham, for hydrogenation of coal and oil is now commencing production and there are indications that other plants of a similar nature may be erected. The marked improvement in the artificial silk trade which was experienced in 1933 has also been maintained during 1934, and this has been reflected in the sulphuric acid and kindred industries. The flourishing state of the motor trade has brought about an increased demand for rubber chemicals, and a remarkable increase in the use of trichlorethylene for metal degreasing is to be noted.

A noteworthy feature of modern chemical processes, states the Chief Inspector, is the increased use of and reliance on instrumental equipment and automatic recording devices for the purpose of indicating the progress of operations. Although the initial cost of providing recording instruments is, in some instances, rather heavy, yet it is found in the long run to be an economy. Not only is more efficient working ensured, but the risk of accident is minimised.

In connection with the emission of smoke and fumes from low-temperature carbonisation plants, experiments have been conducted using a new type of charging car. These experiments yielded such promising results that a new battery of retorts is to be fitted with the device which, it is hoped, will materially reduce the volume of escape.

The characteristic harshness of the fumes from wire enamelling (70th Report, p. 9) is probably due to the presence therein of acroleinic bodies and hydrocarbons. During the past year efforts have been made to reduce low-level escapes by the redesigning of the drying stoves and by an improved system of draughting, and, judging from the lessening of complaints, such efforts have been successful. It has also been found possible to reduce the offensiveness of the fumes escaping from the stack, although, as yet, no completely successful treatment has been devised.

At rubber substitute works acid fumes, arising from the use of sulphur chloride, have been the cause of continued complaint. At one of these works a limestone scrubber has been installed to absorb the acid gases, and little doubt is felt that this will be effective when the operatives have gained a little more experience in its efficient operation. The handling of sulphur chloride at this and other works is not very satisfactory and it is hoped shortly to evolve an improved and safer method.

Artificial Silk Works

The nuisance caused by escape of sodium acetate dust from an artificial silk works (70th Report, p. 9) has now been satisfactorily settled. The company erected an excellent washing plant for the purpose of arresting the dust. This was put into operation in July, since when no further complaint has been received.

During 1934 complaints have again been received against works operating the viscose process for the manufacture of artificial silk. A number of firms have shown an active and energetic interest in this very difficult problem. The use of chlorine, in the gaseous phase, has been tried at several works and opinion is general that, although some improvement results, the characteristic odour remains sufficiently in evidence to cause complaint. An attempt at scrubbing the gases with weak ammonia solution was not very encouraging, but it led, at one works, to a trial of washing with clean cold water and this procedure on an experimental scale has proved surprisingly effective. The possibilities of this simple method are being further explored. The evacuation of xanthating churns may be a factor contributory to complaints against viscose works, involving, as it does, the emission of some carbon disulphide to atmosphere. The possibilities of recovery of waste carbon disulphide are being considered and it is hoped that an economic process may be developed.

Wet Process Copper Works

At alkali and copper (wet process) works the tonnage of salt decomposed in 1934 was 58,679 tons in the salt-cake process and 7,761 tons in the wet copper process. Compared with those of last year these figures show an increase of 2,206 tons used in the salt-cake process and an increase of 2,669 tons used in the wet copper process. Plants have been maintained in good order and the average escape of hydrochloric acid gas to atmosphere has been satisfactorily low (0.069 grain HCl per cubic foot). Taking a round figure of 90 per cent. for the sodium chloride content of the salt and ignoring that in the salt-cake, the average efficiency for all salt-cake processes works out at 94.1 per cent. Individual results vary from 83.5 per cent. to 104.6 per cent., showing that there is room for much improvement at some works. Only two cases of the statutory limit for figures being exceeded have been noted during the year; at one works an escape of 0.22 grain hydrochloric acid per cubic foot was found, following a breakdown of one of the draughting fans, the matter was quickly rectified, but at another works the escape rose to 0.35 grain during some necessary repairs. Low level escape of fume, with consequent loss of efficiency, is frequently due to cracking of earthenware fume mains; these have been replaced with good results at one works by steel mains lined with rubber.

At cement works the chain system of dust arrestment seems to have been developed to a state of maximum efficiency. An offshoot from the chain system is the "calcinator" which has recently been installed at several works. This is designed further to utilise the sensible heat of the kiln gases for drying the slurry and is no doubt a means of fuel economy. An increase in dust emission has followed in cases where this apparatus has been adopted and, although this fact may

be due to inexperience as to the optimum working conditions, yet one cannot but regard the innovation with misgiving. It is quite evident, at all events, that its installation must be accompanied by the provision of really efficient dedusters.

A new sintering plant was started during the year. The company concerned receives burnt pyrites from acid works and supplies the sintered material to local ironworks. In deciding as to the registrability or otherwise of this type of process, the Chief Inspector is guided by the concentration of sulphur in the raw material employed. In this particular case the concentration was 3 per cent., on which basis it seemed that registration as a smelting works could scarcely be enforced. Soon after starting, however, complaint was made against the works on the grounds of dust nuisance and smell. Discussions were held with officials of the company and means whereby the trouble could be diminished were indicated.

Tests at Smelting Works

Tests made at smelting works during the year have shown an average acidity (in terms of SO_3) in the escaping gases of 2.38 grains per cubic foot which is a little higher than last year's average. The National Smelting Co., at its works at Avonmouth and Seaton, recovers the sulphur dioxide in the roaster gases as sulphuric acid. The new distillation unit mentioned in last year's report has been put into operation and has already resulted in a substantial reduction of zinc fume. Further improvements in this direction are possible in this new plant and no doubt the company will experiment with this end in view.

The fumes from the refinery of the Mond Nickel Co., at Clydach, to which reference was made in the 70th Report, have been the source of continued complaint. The problem was accentuated by an increased production of nickel. Experiments were made whereby it was hoped that the sulphur dioxide content of the waste gases would be turned to good account, but these were considered to be impracticable and were eventually abandoned owing to changes in the manufacturing policy of the company. The production of copper sulphate, which had been an outlet for copper in the matte, has been almost given up and maftes of much lower copper and sulphur content are now being used. The effect has been to halve the amount of sulphur discharged and thus to halve also the acidity of the chimney gases. Since this policy was adopted no complaint has been made.

In the investigation of this particular complaint, the method of estimating atmospheric sulphur pollution developed by the Building Research Station was employed. A number of porcelain cylinders, coated with lead peroxide, have been exposed for periods of one month at a time at selected positions in the locality. The attack on the coating by sulphur oxide in the atmosphere is estimated by careful analysis of the coating.

Sulphuric Acid Works

The production of sulphuric acid in England and Wales during 1934 was 730,000 tons, calculated as monohydrate; this is an increase of 81,500 tons compared with the production in 1933. The number of infractions of the provisions of the Act relating to excessive escapes were fewer than in the previous year. The escape of 7.8 grains at one works was attributed to a shortage of steam, but a more detailed investigation showed that proper and regular supervision had been neglected for some time past. The reprimand which followed has evidently been effective, for since then the escape has been low on each occasion that it has been tested. The average of all tests made at sulphuric acid (chamber) plants was 1.28 grains (expressed as SO_3) per c. ft.

In several cases irregularity of sulphur content and impurities in the spent oxide in use were blamed for disorganisation of the acid plants. There is no doubt that an undue proportion of ammonia and tarry matter in spent oxide is very objectionable. Oxide that has been "weathered" is seldom troublesome in this respect. Moreover "forwarned is forearmed," and it should be the duty of the works chemist to indicate the approaching use of a doubtful consignment of oxide.

The method of testing hitherto employed by district inspectors for estimating total acidity of chamber plant escapes by absorption in hydrogen peroxide is unsatisfactory in that it does not include all the acidity due to oxides of nitrogen. Investigations in the laboratory led to the development of a modified test which is described in an appendix to the report. District inspectors are now employing this method and are testing its reliability. Should it prove satisfactory it is proposed to adopt it as the official method. Section 6 (1) of the Act distinctly provides that "the acid gases of sulphur or of *sulphur and nitrogen* . . . shall not exceed the equivalent of 4 grains of sulphuric anhydride." Such tests as have already been made indicate that a normal escape of from 1 to 2 grains of sulphur dioxide is usually accompanied by 0.5 to 1 grain of oxides of nitrogen (expressed as NO_2). Now, it will be found that this amount of escape corresponds roughly with a nitre consumption figure of 3 lb. $NaNO_3$ per 100 lb. of sulphur burned, so that there are some grounds for thinking that the loss of nitre via the exit very nearly balances that supplied (as make-up) to the plant.

At sulphuric acid (Class II) works four cases occurred where the statutory limit of 1.5 grains was exceeded. The lapse at one works was due to a cracked basin in the cascade. The basin was immediately replaced by a new one so that the high acidity was of very short duration. The cascade process of concentration is a decided improvement on some of the older methods, such as those in which glass retorts are used, but the tipping and cracking of basins is certainly an inherent weakness. From information obtained it appears that, on a cascade plant of 90 basins, one may expect 20 breakages, at least, per annum and, doubtless, each occasion would be followed by a period of high escape. The average of tests made at concentration plants was 0.66 grain (in terms of SO_3) per c. ft.

Works in the oleum class have functioned satisfactorily although attention has had to be drawn occasionally to low level escapes from corroded pipe-lines and valves. Further improvements have been effected in the manufacture of converter masses and in the matter of heat exchange, but the acidity of escapes from some works is deplorably high. The average of all tests taken during the year was 3.74 grains (in terms of SO_3) per c. ft. It is appreciated that scrubbing with alkali is not practicable in all cases and some other method of more general applicability is urgently needed.

Chemical Manure Works

A recent amalgamation of trading interests has resulted in a proposal to erect a new superphosphate works at Avonmouth. It is understood that this will operate the "Oberphos" process, which is at present in use at Fison, Packard and Prentice's works at Ipswich. The latter plant has operated throughout the year, an excellent superphosphate is produced and the requirements of the Act regarding the escape of noxious gases have been fully met.

During 1934 there was a further decrease of 15 in the number of plants registered for the production of sulphate and muriate of ammonia. In the past ten years there has been a net decrease of 269 or 48 per cent. in the number of plants in operation. Most of the small plants are now becoming derelict, for, although prices have improved, they are still low unless the manufacturer is fortunate enough to command a local sale. Lack of co-ordination between acid manufacturers and sulphate producers has allowed the market, in some cases, to be lost. On the other hand, the encouragement given by the Ammonia Committee of the Institution of Gas Engineers to the concentration of gas liquor for subsequent delivery to central fertiliser works is gradually having its effect. There has been an increase of six in the number of undertakings where such concentration is practised and a considerable increase is anticipated during the coming year. The establishment of a works in the South of England for manufacture of a special fertiliser has led to two gasworks making small alterations in their plant to enable them to produce concentrated liquor instead of sulphate with, it is said, considerable financial advantage.

Stewarts and Lloyds, Ltd., opened their new coke ovens at Corby in May. This installation is equipped with a very complete by-product recovery plant, including that of sulphate of ammonia. The process operated at the Manchester Corporation's works at Partington for dephenolation of the raw gas liquor has functioned throughout the year and its commercial success is said to be established.

Extended Use of Chlorine

The use of chlorine in industry is expanding and a number of new works have been registered. Its employment in paper and calico bleach works has appeared to be quite satisfactory, although the supervision available is not always adequate for proper control of a potentially dangerous process. The

application of chlorine, for the purpose of slowing down the rate of decomposition, has lately been practised at a certain sewage works. The chorine cylinders are housed in structures which are situated in the public road, but they are protected against impact by steel barriers. It is understood that the process is experimental and that, if successful, the cylinders will be housed in underground structures.

To avoid corrosion of chlorine feed pipes in the manufacture of calcium hypochlorite, various materials have been tried. Of these, tellurium lead has offered the greatest promise, but most manufacturers still prefer to use pipes of mild steel or wrought iron and to renew them frequently.

At synthetic hydrochloric acid works, condensation of hydrochloric acid gas has been consistently good. Escapes of acid gas at muriatic acid works in general have been well below the statutory limit imposed by the Act. At salt works the average of all tests made showed an escape of 0.05 grain hydrochloric acid per c. ft. The condensation of arsenious acid has been satisfactory, the average figure for concentration in the escaping gases being 0.023 grain (As_2O_3) per c. ft. At works where there is liability of arsine being produced, periodic work stests are now being made; this practice is to be encouraged.

Acidity tests on the chimney gases at one carbon bisulphite works have averaged 1.89 grains (in terms of SO_3) per c. ft., but on no occasion has unburned hydrogen sulphide been detected therein. At another bisulphide of carbon works the practice has been to burn the residual gases and to utilise the products of combustion in a sulphuric acid plant; this system was found to be rather unsatisfactory and has been replaced by a Claus kiln.

There has been considerable extension of the practice of removing carbon disulphide from benzol both by washing with methanol soda and by the Yorkshire Tar Distillers method. Recovery of carbon disulphide from the washing medium appears to be quite successful. Recovery from the sodium methyl xanthate is practised at only a few works. Some difficulty has been experienced in disposal of the recovered material and fears are entertained lest the excessively foul gases, which are liberated in the process, may occasion trouble. An investigation detailed in an appendix to the present report indicates that an alkaline xanthate in storage breaks down to sulphide and carbonate. On acidification, therefore, the quantity of hydrogen sulphide liberated increases with the age of the xanthate, while the recoverable carbon disulphide decreases. A neutral xanthate is more stable, but exhibits a tendency towards production of the even more objectionable mercaptans.

Tar Distillation Works

Tar distillation plants have, in general, been kept in a satisfactory state of repair and the necessity of draughting away foul tail gases during the whole period of distillation has been better appreciated. Nevertheless, in a number of instances exception has had to be taken to inefficient means used for preventing escapes of such gas to atmosphere. In some cases draught was lost owing to lids of receiver boxes becoming ill-fitting either by reason of wear or their dirty condition. In other cases the injector was found to be faulty or inadequate.

Further complaints have been made alleging offensive smells and emanations from certain works. To some extent these have been traced to (1) discharge of pitch at an excessive temperature, and (2) wind-borne spray from open creosote oil storages. The former matter can be readily remedied and a satisfactory check is now maintained by the provision of recording thermometers: the cure for the latter seems to be in the roofing of the tanks and this has now been promised. It has been necessary, however, to emphasise to complainants that even when every reasonable precaution is taken, some little smell in the immediate neighbourhood of a tar works must be tolerated. The very nature of the operations makes it impossible to eliminate every trace of odour.

The extraction of benzol from coal gas continues to grow in favour. The number of processes registered under this heading in 1934 increased by 46. Even at vertical retort installations the process is evidently attractive although these produce a spirit of less aromatic content. Certain works have experienced difficulty by reason of excessive sludge formation in the oil used for scrubbing the gas. The trouble has been overcome generally by adopting the use of a more refined oil (*e.g.*, spindle oil) and/or by more efficient detarring of the gas prior to scrubbing.

New British Chemical Standard

Iron Containing Special Elements

IN view of the increasing interest in alloy cast irons British Chemical Standards are now issuing the first of a series of irons containing special elements. This standard analysed sample is more or less typical of the type used for the production of specially hard cast irons by alloying and heat treatment and should be useful to chemists wishing for more information about the determination of Ni, Cr, and Mo and the effect of these elements on the determination of the ordinary constituents.

The standard turnings have been carefully analysed as usual by a number of experienced chemists representing the different interests involved, *viz.*, the B.C.I.R.A., independent analysts, a government department, a ferro alloy manufacture, and producers and users of alloy cast irons. The constituents standardised are:—

	%		%
Total Carbon	2.79—	Sulphur	0.068
Graphitic Carbon	1.99—	Phosphorus	0.348
Combined Carbon	0.80—	Nickel	1.71—
Silicon	1.64—	Chromium	0.405
Manganese	0.93—	Molybdenum	0.36—

It is believed that this is the only standard of its kind in Great Britain and is therefore likely to be of interest to chemists associated with the manufacture and use of alloy irons, including the aviation, motor and engineering industries.

The standard is issued in bottles containing 500, 100, 50 and 25 gms. Each bottle is provided with a certificate showing the analysis of each chemist, together with an outline of the methods used, in particular the method for determining molybdenum has been dealt with at some length and will no doubt be of interest. The standard may be obtained from British Chemical Standards headquarters (Ridsdale and Co.), 3 Wilson Street, Middlesbrough, or from any of the usual laboratory furnishers.

Letters to the Editor

Report of the Poisons Board

SIR,—There is a further point in connection with the report of the Poisons Board to which we should like to draw the attention of your readers.

The report suggests that it is important that those manufacturing poisons should be under the control of a body with disciplinary powers. It has already been observed that the Board has ignored the recommendations of the B.A.C. which, besides supplying its members with documentary evidence of competency in chemistry, has the same regulations regarding disciplinary action as the other bodies named in the Schedule. But having laid this requirement down the report includes a category (Miscellaneous. Section 27, page 52(d).) which entirely invalidates it. The paragraph reads as follows: "A person who, for a continuous period of three years before the date on which these rules came into operation, was continuously engaged in the manufacture of pharmaceutical preparations containing poisons and prepared for the internal treatment of human ailments, and has furnished to the registrar of the Pharmaceutical Society a statement in writing, verified by statutory declaration, to that effect."

There is no suggestion that, even if it has power to do so, the Pharmaceutical Society will register or licence these persons. The position is therefore this: Honours graduates in chemistry are excluded from supervising work of this kind because no disciplinary action is possible in their case, but persons with three years' practice in the manufacture of poisons, but without other qualifications, and against whom no disciplinary action can be taken, are included. Members of the British Association of Chemists who are subject to ethical control and qualified are excluded.

Without considering the other anomalies of the report, to which attention has already been drawn, this one, in itself, indicates that the Poisons Board has given very inadequate attention to certain aspects of the problem.—Yours faithfully,

HENRY T. F. RHODES,
Editor, "The Chemical Practitioner."

British Association of Chemists,
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Chemistry and Cleanliness

I.C.I. Exhibits at the Health Exhibition

SOME of the larger problems of public health, such as the disinfection of public buildings, water sterilisation, and the disinfestation of slum property, find a solution in one of the two products to be shown by Imperial Chemical Industries, Ltd., at the Health Exhibition, which opens at Bournemouth on July 15.

"Chloros," which is a solution of sodium hypochlorite containing about 10 per cent. "available chlorine" by weight, is an extraordinarily efficient disinfectant rendered equally economical by the fact that it is effective in very dilute solutions. It is soluble in water in all proportions and just as effective in salt water. It completely arrests the progress of decomposition by killing all organisms and, being a powerful deodorant, removes all unpleasant smells by oxidation of the products of decomposition. Almost as important is the fact that in the concentrations necessary for disinfection it is non-poisonous to men and animals. As witness to the powerful germicidal properties of "Chloros" there will be shown on the I.C.I. stand sets of cultures of certain organisms and of similar cultures after sterilisation with "Chloros."

I.C.I. also takes part in the attack on one of the major health problems of the day in producing hydrocyanic acid for the disinfection of slum property. Their exhibit will consist of a description of methods for the eradication of bed bugs, with samples of hydrocyanic acid, orthodichlorbenzene, and Zyklon. Treatment with hydrocyanic acid, either as liquid HCN or Zyklon (which is HCN absorbed in kieselguhr), is indeed the only practical and reliable method for its complete destruction. Fumigation with orthodichlorbenzene (o.d.c.b.) is also used successfully when, for example, there is a single infested flat in an occupied block not scheduled for demolition. To prevent the reinfestation of new property by the removal of infested furniture from the old house to the new, the general procedure is to treat the furniture and other goods in a special removal van at a fumigation centre en route, the work being carried out by contractors who specialise in it. The importance of this work will be realised from the fact that many slum areas of this country are bug-infested up to as high as 80 per cent. of the houses.

Glass Industry Research

Resistance of Refractory Materials to Slagging

A NEW method of determining the resistance of refractory materials to slagging was described by Mr. A. E. J. Vickers and Mr. R. A. Bell, at a meeting of the Society of Glass Technology held at Liverpool, on June 19, when the president, Mr. Bernard P. Dudding, occupied the chair. The apparatus described was devised to enable a semi-technical investigation to be made of the action of specific slags, glasses or dusts, upon refractory materials of different types. It consists essentially of a circular furnace lined with the refractories under test. A rotating blowpipe fed with gas and air under pressure heats the refractories, while the slag or glass is fed in through the blowpipe. Lantern slides were shown to illustrate the results which had been obtained with refractories of various types when subjected to the action of powdered glass at 1,500° in the furnace. The work was carried out in the ceramic research laboratory of Imperial Chemical Industries, Ltd., at Billingham.

In a paper on the influence of iron oxide, carbon, sulphur and selenium in colouring soda-lime-silica glasses, following an introductory summary by Professor W. E. S. Turner, Mr. A. Ally, M.Sc., reviewed the literature. He then described experiments in which small meltings were made in platinum from specially purified silica, calcium carbonate, and sodium carbonate, and the colours produced by the various agents, oxidising as well as neutral atmospheres being employed. Carbon or sulphur alone did not produce any colour in soda-lime-silica glasses melted from pure materials. Carbon and sulphur together produced no colour in soda-lime-silica glasses made from pure materials. Iron oxide, even in very small amounts, exerted a great influence, the brown or amber colours produced when it was present in the glasses being usually attributed to carbon and sulphur. Two per cent. of selenium melted in batch materials specially freed from iron oxide gave only a very light pink colour. When 0.02 per cent. of Fe_2O_3 was present in the glass, the colour became yellowish brown, not altering appreciably on reheating.

In presenting a paper on the decomposition of sodium nitrate, and its reaction with silica, Mr. W. Maskill, B.Sc., and Professor W. E. S. Turner reported that sodium nitrate alone melted at 318° C. and in the solid state no decomposition took place. At 400° incipient decomposition was noted, which was greatly accelerated at higher temperatures. By the analyses of the gaseous products as well as the residues from heating in vacuo, the nitrate had been found to melt without decomposing, but on raising the temperature decomposition set in, yielding the nitrite and oxygen, and finally the nitrite yielded oxides of nitrogen, the platinum containing vessels being extensively attacked. No reaction took place between silica and sodium nitrate in the solid state. When fused at 450°, the constituents reacted at an irregular rate, the reaction apparently depending on formation of the nitrite.

Low Temperature Carbonisation

Beneficial Effect of the Hydrogenation Process

As a result of the company having received inquiries from shareholders as to the relationship between low temperature carbonisation and hydrogenation, and the effect of competition, if any, between the two processes, Low Temperature Carbonisation, Ltd., has issued a circular to the shareholders, pointing out that the successful development of the process of hydrogenation can only have a beneficial effect upon the low temperature carbonisation industry as it affords an efficient and economic means of converting coal oil into petrol.

For some years past Imperial Chemical Industries, Ltd., and the Fuel Research Board have been engaged in perfecting the hydrogenation process and it is now operating successfully on a large scale. No smokeless fuel is made in the process, and there is therefore no competition with "Coalite," the main product of Low Temperature Carbonisation, Ltd. On April 5, 1935, the first trainload of "Coalite" coal oil left Barugh works for the hydrogenation plant at Billingham and was there converted into petrol. This train was followed by others and a long term contract has now been entered into by the two companies covering the supply of large quantities of "Coalite" coal oil. For the first time, therefore, it would be possible with these two processes of low temperature carbonisation and hydrogenation to supply, if required, the whole of the petrol requirements of the Royal Air Force.

Diesel oil made from coal by Low Temperature Carbonisation, Ltd., will not be subject to the tax of 8d. per gallon which will come into force next month. A Diesel engine laboratory has been established by the company in London equipped with the necessary test engines and other apparatus. Satisfactory trials with the company's product have already been carried out and the development of suitable types of Diesel oil for all classes of engine is well in hand. It is expected that this new business will add considerably to the profit earning capacity of the company.

A contract has been placed for a new oil and chemical plant to be erected in South Yorkshire; this will constitute a valuable addition to the company's resources. During the past twelve months further batteries of retorts have been erected at Askern, the capacity of which has been doubled during the past two years. The location of the further "Coalite" plants will depend to some extent upon the action that is being taken as a result of the reports of the Commissioners appointed for the Special Areas.

SHIPMENTS of china clay were very satisfactory during May, the details of which are as follows:—Fowey, 37,783 tons china clay; 2,040 tons china stone; 1,824 tons ball clay. Par, 10,144 tons china clay; 1,824 tons china stone. Charlestown, 6,519 tons china clay; 27 tons china stone. Padstow, 821 tons china clay. Looe, 290 tons china clay. Plymouth, 158 tons china clay. Newham, 93 tons china clay; and 5,712 tons china clay were conveyed entirely by rail—making a total of 66,696 tons, compared with 67,699 tons in April.

Continental Chemical Notes

Poland

IMPROVED YIELDS OF ETHYLENE OXIDE (amounting to 90 per cent. of the theoretical) are claimed to follow reaction of ethylene chlorhydrin with lime instead of with soda ("Dominik and Bartkiewiczowna, Przcmysl Chemiczny," *18*, 373).

Germany

BACTERIAL DECOMPOSITION of sodium hyposulphite solution can be prevented and clarity maintained for at least three years by adjusting the alkalinity to a *p*H of 9 to 10. This can be done, for example, by adding 0.2 gram sodium carbonate and 3.8 grams borax to each litre of solution ("Seifensieder-Zeitung," *62*, 18).

Czecho-Slovakia

MOLASSES OUTPUT during the 1933-34 season totalled 116,000 tons, sales of which in round figures were distributed as follows: 2,100 tons for polishes, 4,400 tons for animal feed factories, 55,000 tons for agriculture, and 59,000 tons for spirit and yeast manufacture.

AN UNCHANGED DIVIDEND OF 10 PER CENT. has been declared on the 1934 trading by the Aussig Verein. Gross turnover was 20 per cent. higher than in 1933, improvement being specially marked in the fertiliser group. Export difficulties are forcing the company to concentrate its resources upon the home market, as, for instance, by producing chemicals hitherto imported. A reported example of the latter tendency is the production of printing inks.

Belgium

RECENT COMPANY REGISTRATIONS include Etablissements Dohmen et Habets, in Liége (capital 3½ million francs), for production of chemicals, and Soc. Internationale des Fertilisants Organiques, in Anderlecht (capital 50,000 francs), for fertilisers.

Finland

METAL PROSPECTING ACTIVITY is reported from the northern part of the country. Canadian geologists are examining the nickel deposits at Petsamo, while gold deposits at two different locations are under examination by English and Swedish experts.

France

BISMUTH MANUFACTURE was recently started by S.A. Mines et Usines de Salsigne, and a monthly output of two tons is anticipated.

SATISFACTORY DEVELOPMENT of the explosives branch, particularly of safety explosives for mining, is revealed in the annual report of Soc. Nobel Française, who declare a dividend of 7 francs (6 francs previous).

A NEW TRISODIUM PHOSPHATE FACTORY is to be built this year by the Kuhlman concern at Waterloo (states an American consular report) in order to supply the North French market. Three other companies are also producing trisodium phosphate for the French market: Société Coignet (Paris), Société Progil (Lyons) and Union Chimique Belge (Brussels).

Personal Notes

MR. EDWARD HUGH ARMITAGE has been elected a director of Brown Bayley's Steelworks, Ltd.

PROFESSOR RICHARD ANCHUTZ, of the Chair of Chemistry in the University of Bonn, has been elected to the Honorary Fellowship of the Royal Society of Edinburgh.

MR. JOE BAMFORTH, of Linthwaite, near Huddersfield, died on July 6 aged 64. He was a director of J. T. Haigh and Co., drysalters, Milnsbridge, and of Godfrey Woodhead and Son, chemical manufacturers, of Slaithwaite.

DR. J. C. E. SIMPSON has been appointed assistant lecturer in organic chemistry at King's College, London. In 1933, Dr. Simpson was elected to a Commonwealth Fund Fellowship, and has since been doing research work in organic chemistry at the Rockefeller Institute, New York.

MR. E. A. ATKINS, upon whom was conferred the honorary M.Sc. degree at Liverpool University graduation ceremony on July 6, was formerly senior lecturer at the Central Municipal Technical School, Liverpool. He was president of the Metallurgical Society in 1929.

MR. W. J. DUNNING has been awarded the United Alkali scholarship in chemical research at Liverpool University. The Leblanc Medal was awarded to MR. H. F. BIRCH, and the Johnson Colonial Fellowship in Biochemistry to MR. G R. TRISTRAM. It was reported that the Leverhulme chemistry prize had been awarded to MR. R. H. ROBERTS.

SIR ROBERT HADFIELD has received the Albert Medal for 1935 of the Royal Society of Arts. The presentation was made on Monday by the Duke of Connaught at the society's headquarters, Clarence House, "for his researches in metallurgy and his services to the steel industry." As far back as 1882, by the discovery of manganese steel, Sir Robert opened a new chapter in the history of metallurgy; and this remarkable alloy, which has found many uses in engineering and in mining, has also stimulated research into the causes of its unique hardness and into the structure of the alloys of iron. During a long career he has devoted much time and energy to forwarding the work and the interests of technical and scientific societies, and has assisted many young workers to persevere in investigations of importance to science and to industry.

MR. R. F. WALL has retired from the board of Tate and Lyle, Ltd

MR. A. P. PASMORE has been appointed a director of the South Metropolitan Gas Co.

MR. JOHN HENRY WREAKS, of 26 Howard Road, Llandudno, Caernarvon, formerly of 45 Hangingwater Road, Sheffield, at one time lecturer in metallurgy in the University of Sheffield, left £6,088 (net personalty £6,023).

MR. PETER CALDWELL and MR. D. R. MACKAY have been reappointed members of the Dyestuffs Advisory Licensing Committee for a further period of three years. Professor Arthur Lapworth having resigned from the committee, the board has also appointed Professor James Kenner in his stead for a period of three years. Mr. Caldwell is vice-chairman of the British Cotton and Wool Dyers' Association. Mr. Mackay is a director of the British Alizarine Co.

MR. ROBERT F. WILSON has been awarded the Royal Society of Arts Silver Medal for his paper on "Colour and Colour Nomenclature." Other recipients include Mr. S. A. Main, "Properties, Characteristics and Uses of Stainless Steel"; Mr. E. M. O'R. Dickey, "Industry and Art Education on the Continent"; Mr. B. C. Burt, "The Indian Sugar Industry"; Dr. F. J. F. Shaw, "Agricultural and Commercial Aspects of the Oil Seeds Industry"; Mr. E. W. Bovill, "Empire Production of Essential Oils for Perfumery."

MR. W. MACNAB, president of the Institution of Chemical Engineers during 1934, has made a donation to the Institution, to be devoted to any purpose which the council may think fit. The council, in accepting the gift, felt that it would be desirable to commemorate Mr. Macnab's intimate association with the Institution, both as one of the founding members and subsequently as its seventh president. Accordingly, with Mr. Macnab's consent, it has been decided to found a William Macnab Medal, which will be awarded for what the board of Examiners considers to be the best set of answers submitted in the associate-membership examination each year, provided that this is of sufficient merit. The details of the award have not been finally settled, but it is hoped that the first award will be made for the 1935 examination.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

THERE are no price changes to report in the markets for general heavy chemicals, rubber chemicals, wood distillation products, tar products, perfumery chemicals, essential oils and intermediates. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works. Up to the present no prices for nitrogenous fectilisers for the new season have been announced, and it is understood that prices for July delivery are the same as those in force for June.

Price Changes

Pharmaceutical and Photographic Chemicals.—IRON AMMONIUM NITRATE, B.P., 2s. 1d. per lb.; Green, 1s. 11d. to 2s. 6d. per lb.

All other prices remain unchanged.

LONDON.—There is no change to report. Prices still remain firm with a steadily increasing demand.

MANCHESTER.—Holiday influences have again been a factor on the Manchester chemical market during the past week, although, on the whole, movements of most of the heavy descriptions have been fully maintained except in respect of the few districts that more or less completely closed down for the annual stoppages. New bookings this week have been on a moderate scale and whilst the bulk of the orders have been for delivery within relatively short periods there has been a sprinkling of contracts extending over the next three or four months. Only slight changes have occurred in values and the market as a whole remains extremely steady, although in respect of the tar products some of the light descriptions, as they have been for some considerable time now, are rather uncertain in tendency.

SCOTLAND.—There has been a steady day-to-day demand for chemicals for home trade during the week, but the export demand continues quiet. Prices generally continue very firm at about previous figures with only slight changes to report. Most works round Glasgow closed for Fair week yesterday.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80%, £39 5s.; tech, 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—Commercial granulated, £25 10s. per ton; crystal, £26 10s.; powdered, £27 10s.; extra finely powdered, £29 10s. packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. SCOTLAND: Crystals £26 10s.; powder, £27 10s.

ACID, CHROMIC.—10½d. per lb., less 5%, d/d. U.K.

ACID, CITRIC.—11¾d. per lb., less 5%. MANCHESTER: 11¾d. SCOTLAND: 11¾d.

ACID, CRESYLIC.—97/99%, 1s. 8d. to 1s. 9d. per gal.; 98/100%, 2s. to 2s. 2d.

ACID, FORMIC.—LONDON: £40 to £45 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works. full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £49 to £54 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 1s. 0¼d. less 5%. MANCHESTER: 1s. 0¾d. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE. SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £34 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6¾d. to 1s. 3d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £16 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £22 to £23, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 to £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—3s. 4d. to 3s. 8d per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4½d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb.; liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £4 2s. less 2½%.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £25 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £34 10s.; brown, £32 10s.

LEAD NITRATE.—£27 10s. per ton.

LEAD, RED.—SCOTLAND: £24 to £26 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £36 10s.

LITHOPONE.—30%, £17 to £17 10s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—7¾d. to 8¼d. per lb. to June 30; 6¾d. to 7¼d. from July 1 to December 31.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38 to £40.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5% d/d U.K. Discount according to quantity. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¼/100%, powder, £37. MANCHESTER: £38 to £40.

POTASSIUM CHROMATE.—6¼d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NIRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B.P., 11½d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8½d. ex store. MANCHESTER: Yellow, 8½d.
SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.
SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r in bags.
SODA, CAUSTIC.—Solid 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£22 per ton. LONDON: £22. SCOTLAND: £20 15s.
SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lot less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.
SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1-cwt. iron drums for home trade.
SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—£32 10s. per ton. SCOTLAND: 3⅞d. per lb.
SODIUM CHROMATE.—4d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.
SODIUM META SILICATE.—£14 per ton, d/d U.K. in cwt. bags.
SODIUM IODIDE.—B.P., 6s. per lb.
SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.
SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5¼d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5¼d.
SULPHUR.—£9 15s. to £10 per ton. SCOTLAND: £8 to £9.
SODIUM SILICATE.—140° Tw. Spot £8 per ton. SCOTLAND: £8 10s.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £14 5s. per ton f.o.b.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 4s. 5d. to 4s. 7d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.
ZINC SULPHIDE.—11d. to 1s. per lb.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb., 100% d/d buyer's works.
BENZIDINE HCL.—2s. 5d. per lb.
p CRESOL 34-5° C.—2s. per lb. in ton lots.
m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 01½d.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3ss. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb.: 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—9½d. to 11d. per lb. *p*-TOLUIDINE.—1s. 11d. per lb.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 10s. to £9. Grey, £12 to £14. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £11; grey, £13 10s.
ACETIC ACID, TECHNICAL, 40%.—£17 to £18 per ton.
CHARCOAL.—£5 to £10 per ton.
WOOD CREOSOTE.—Unrefined, 3d. to 1s. 6d. per gal.
WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 6d. per gal.; solvent, 3s. 3d. to 4s. 3d. per gal.
WOOD TAR.—£2 to £4 per ton.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 6¾d. to 8¼d. per lb.; crude, 60's, 1s. 1½d. to 2s. 2½d. per gal. MANCHESTER: Crystals, 7¼d. per lb.; crude, 2s. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.
ACID, CRESYLIC.—90/100%, 1s. 8d. to 2s. 3d. per gal.; pale 98%, 1s. 5d. to 1s. 6d.; according to specification. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude, 9½d to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 3½d. SCOTLAND: Motor, 1s. 6½d.
CREOSOTE.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 5d. to 5¾d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4½d.; heavy, 4¼d. to 4½d.
NAPHTHA.—Solvent, 90/100%, 1s. 5d. to 1s. 6d. per gal.; 95/160%, 1s. 6d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4½d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £10 per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.
PITCH.—Medium soft, 35s. per ton. LONDON: 40s. per ton, f.o.b. East Coast port. MANCHESTER: 32s. to 34s. f.o.b. East Coast.
PYRIDINE.—90/140, 5s. 6d. to 8s. 6d. per gal.; 90/180, 2s. 3d.
TOLUOL.—90%, 1s. 11d. to 2s. per gal.; pure, 2s. 2d.
XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 1d. to 2s. 2d.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—£7 5s. per ton; for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.
CYANAMIDE.—£7 5s. per ton delivered in 4-ton lots to farmer's nearest station.
NITRATE OF SODA.—£7 12s. 6d. per ton for delivery in 6-ton lots, carriage paid to farmer's nearest station for material basis 15.5% or 16% nitrogen.
NITRO-CHALK.—£7 5s. per ton in 6-ton lots carriage paid for material basis 15.5% nitrogen.
CONCENTRATED COMPLETE FERTILISERS.—£10 5s. to £10 17s. 6d. per ton according to percentage of constituents, for delivery in 6-ton lots carriage paid.
NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton.

Latest Oil Prices

LONDON, July 10.—LINSEED OIL was firmer. Spot, £22 15s. (small quantities); July and Aug., £20 7s. 6d.; Sept.-Dec., £20 10s.; Jan.-April, £20 15s., naked. SOYA BEAN OIL was quiet. Oriental (bulk), July-Aug., shipment, £17 5s. RAPE OIL was inactive. Crude extracted, £31 10s.; technical refined, £32 10s. naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £23 10s.; refined common edible, £26 10s.; deodorised, £28 10s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was firmer. American, spot, 43s. 3d. per cwt.

HULL.—LINSEED OIL, spot, quoted £21 5s. per ton. July, £20 12s. 6d.; Aug., £20 12s. 6d.; Sept.-Dec., £20 10s. COTTON OIL—Egyptian crude, spot, £24; edible, refined, spot, £27; technical, spot, £27; deodorised, £29, naked. GROUNDNUT OIL, extracted, spot, £30 10s.; deodorised, £33 10s. RAPE OIL, extracted, spot, £30 10s.; refined, £32. SOYA OIL, extracted, spot, £21 10s.; deodorised, £24 10s. per ton. CASTOR OIL, pharmaceutical, 40s. per cwt.; firsts, 35s.; seconds, 32s. COD OIL, f.o.r or f.a.s, 25s. per cwt., in barrels. TURPENTINE, American, spot, 45s. 3d. per cwt.

Inventions in the Chemical Industry

Patent Specifications and Applications

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Stabilising Hydrogen Peroxide

SOLUBLE salts of the acid pyrophosphoric esters of aliphatic alcohols containing at least eight carbon atoms in the molecule are used for stabilising peroxide solutions. In an example, a bleaching bath containing hydrogen peroxide and ammonia is stabilised by adding the sodium salt of the acid lauryl pyrophosphoric ester. Ester salts derived from myristyl, oleyl, and ricinoleyl alcohols may also be used. (See Specification 421,843 of H. T. Böhme A.-G.)

Cleansing Compositions

A COMPOSITION, suitable for making up an alkaline solution for use in cleaning, especially removing grease from, metal surfaces prior to etching or galvanising the metal, comprises one or more unsaturated poloxy reduction products of unsaturated oxyfatty acids containing at least eight carbon atoms and one or more substituted or unsubstituted phenols. A mixture of dioxyoctadecene and cresol is specified in an example. (See Specification 421,625 of Deutsche Hydrierwerke A.-G.)

Making Emulsions

ASPHALTIC or bituminous materials of high viscosity are rendered more fluid by adding thereto more than two per cent. of fluxing compounds comprising phenols (including crude creosotes and phenols, and various tars) or alkaline phenates which may be anhydrous or in concentrated aqueous form. The fluidity of the resultant mixture may be increased by the addition of a limited quantity of water or of neutral or acid aqueous solutions. Emulsions may be made from the mixture. (See Specification 421,113 of E. Ronault).

Iron-Free Aluminium Salts

IN a modification of the process described in the parent specification, iron is removed from acid solutions of aluminium sulphate by treating the hot solution, if necessary after reduction of any ferric iron to the ferrous state, with a salt of β-naphthalene sulphonic acid, with a metal such as barium or calcium whose sulphate is sparingly soluble or insoluble at ordinary temperature. The alkali salt of the sulphonic acid may be regenerated from the separated precipitate and may be converted to the alkaline earth metal salt for re-use by means of alkaline-earth metal chloride. (See Specification 422,318 of J. R. Geigy A.-G.).

Complete Specifications Open to Public Inspection

NOVEL CYCLIC KETONES, manufacture.—A. Maschmeijer, junr. Chemische Fabriek. Dec. 15, 1933. 12605/34.

PRODUCTS COMPRISING VEGETABLE PHOSPHATIDES, production.—Hanseatische Muhlenwerke A.-G. Dec. 13, 1933. 18771/34.

PRECIPITATES, method of producing.—New Jersey Zinc Co. Dec. 15, 1933. 20835/34.

ZINC SULPHIDE PIGMENT, manufacture.—New Jersey Zinc Co. Dec. 15, 1933. 20837/34.

ZINC OXIDE, making.—American Zinc, Lead and Smelting Co. Dec. 13, 1933. 33873/34.

3-AMINO-QUINOLINES, manufacture.—I. G. Farbenindustrie. Dec. 15, 1933. 34189/34.

METALS, method for the production.—Oesterreichisch Amerikanische Magnesit A.-G. Dec. 12, 1933. 34352/34.

PLASTIC COMPOSITIONS.—Carborundum Co. Dec. 11, 1933. 35469/34.

ALKYLATED IMIDAZOLES of high molecular weight, manufacture. Soc. of Chemical Industry in Basle. Dec. 15, 1933. 35578/34.

REDUCTION OF FOAM FORMATION.—Aktieselskabet Dansk Gærings-Industri. Dec. 12, 1933. 35588/34.

SEPARATION OF ACETIC ANHYDRIDE from mixtures containing it, process and apparatus.—Usines de Melle. Dec. 12, 1933. 35589/34.

CELLULOSE PRODUCTS, treatment.—Deutsche Hydrierwerke A.-G. Dec. 12, 1933. 35738/34.

CYCLIC ESTERS, manufacture.—E. I. du Pont de Nemours and Co. Dec. 12, 1933. 35744/34.

SOAP AND SOAP MASSES, manufacture.—Inzersdorfer Chemische Industrie Ges. Dec. 14, 1933. 35794/34.

AZO DYESTUFFS and metal compounds thereof, manufacture.—I. G. Farbenindustrie. Dec. 13, 1933. 35829/34.

WATER-SOLUBLE SALTS OF IMIDO-ETHERS, imidothioethers, or amidines, manufacture.—I. G. Farbenindustrie. Dec. 13, 1933. 35830/34.

PERMANENT PERSILICATES with high content of hydrogen peroxide or active oxygen, methed of producing.—F. Krauss. Dec. 15, 1933. 35897/34.

GUANYL AND BIGUANYL COMPOUNDS, manufacture.—I. G. Farbenindustrie. Dec. 16, 1933. 35973/34.

FLAVOURING MATTERS and their application.—Imperial Chemical Industries, Ltd. Dec. 16, 1933. 35988/34.

POLYMETHINE DYESTUFFS, manufacture.—I. G. Farbenindustrie. Dec. 16, 1933. 36153/34.

AMINO-CHRYSENE-SULPHONIC ACIDS, manufacture. I. G. Farbenindustrie. Dec. 15, 1933. 36156/34.

CELLULOSE NITRATE, treatment.—E. I. du Pont de Nemours and Co. Dec. 16, 1933. 36164/34.

Specifications Accepted with Date of Application

ESTERS OF DICARBOXYLIC ACIDS, and compositions containing these esters.—Kodak, Ltd. Sept. 10, 1932. 429,915.

ANTHRAQUINONE DERIVATIVES, manufacture.—Imperial Chemical Industries, Ltd., F. Lodge and C. H. Lumsden. Nov. 28, 1933. 430,160.

COLLOIDAL SUSPENSIONS and the process of making same.—E. H. Land. Dec. 3, 1932. 429,925.

AZO DYESTUFFS, manufacture and application.—Imperial Chemical Industries, Ltd., and A. H. Knight. Dec. 4, 1933. 430,079.

SEPARATION OF AMMONIA AND HYDROGEN SULPHIDE from gases.—J. Y. Johnson (I. G. Farbenindustrie). Dec. 4, 1933. 430,007.

METALLURGICAL SLAG REACTIONS.—Heraeus Vacuumschmelze A.-G., and Dr. W. Rohn. Dec. 6, 1932. 429,926.

ANTHRAQUINONE DYESTUFFS, manufacture and application.—Imperial Chemical Industries, Ltd., F. Lodge and H. A. Piggott. Dec. 6, 1933. 430,013.

VALUABLE OILS from liquid or meltable solid carbonaceous materials composed of constituents having different solubilities in light hydrocarbon solvents, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Dec. 6, 1933. 430,080.

MONOAZO DYESTUFFS, manufacture and application.—Imperial Chemical Industries, Ltd., and A. H. Knight. Dec. 8, 1933. 429,936.

UNSATURATED ETHERS OF CELLULOSE, production.—E. I. du Pont de Nemours and Co. Dec. 10, 1932. 429,949.

1-ALKYLAMINO-4-ARYLAMINO-ANTHRAQUINONES, manufacture.—Soc. of Chemical Industry in Basle. Dec. 10, 1932. 429,951.

MINERAL-OIL POWDERS, process of producing.—Kerasin, Ltd. Dec. 13, 1932. 430,024.

AZO DYESTUFFS, manufacture.—M. J. G. Bader. Dec. 13, 1932. 430,167.

SULPHURIC ACID, manufacture.—D. Tyrer, A. M. Clark and Imperial Chemical Industries, Ltd. Dec. 13, 1933. 430,092.

SULPHUR DYES, manufacture.—Imperial Chemical Industries, Ltd., E. Chapman and E. A. Littlewood. Dec. 14, 1933. 430,171.

1-HYDROXY-4-ALKOXYANTHRACENES, manufacture.—I. G. Farbenindustrie. Dec. 16, 1932. 430,250.

TRISAZO DYESTUFFS, process for the manufacture.—I. G. Farbenindustrie. Dec. 21, 1932. 430,252.

ALPHA CELLULOSE, manufacture.—J. S. Pou. Oct. 21, 1933. 430,259.

DERIVATIVES OF THE ANTHRAQUINONE SERIES containing nitrogen and sulphur, manufacture.—I. G. Farbenindustrie. Dec. 17, 1932. 430,260.

SACCHAROSONIC ACIDS and their salts, process for the manufacture.—Dr. H. Ohle. Dec. 23, 1932. (Cognate application 1630/34.) 430,264.

ANHYDROUS SULPHATE OF COPPER containing potassium or sodium sulphate and process and apparatus for the manufacture thereof. P. Lanthier. Jan. 5, 1933. 430,180.

CONDENSATION PRODUCTS from unsaturated oils.—Soc. of Chemical Industry in Basle. Jan. 11, 1933. 430,038.

ASYMMETRICAL DYESTUFF of the thioindigo series, manufacture. A. Carpmael (I. G. Farbenindustrie). Feb. 2, 1934. 430,105.

HISTAMINE AND ITS DERIVATIVES, preparation.—Boot's Pure Drug Co., Ltd., F. L. Pyman and B. Garforth. Feb. 23, 1934. 430,108.

SULPHUR, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). March 5, 1934. 430,110.

SULPHURISED DYESTUFFS, manufacture.—Soc. of Chemical Industry in Basle. May 17, 1933. 430,055.

1-ALKYLAMINO-4-ARYLAMINO-ANTHRAQUINONES, manufacture.—Soc. of Chemical Industry in Basle. Dec. 11, 1933. 430,214.

CARDIO-ACTIVE PRINCIPLES OF SQUILL, method of extracting.—C. S. Dyas and Grisard Laboratories, Inc. July 20, 1934. 430,280.

HALOGENATED HYDROCARBON COMPOUNDS.—British Thomson-Houston Co., Ltd. Nov. 29, 1933. 430,298.

ALKYLATED 5 : 5-PHENYLETHYLHYDANTOINS, manufacture.—L. S. E. Ellis and Chemical Works, formerly Sandoz. Dec. 15, 1933. 430,282-3.

ACYL DERIVATIVES OF SALICYLIC ACID and its esters, production of difficultly dissociable.—H. D. Elkington (Godecke and Co. Chemische Fabrik A.-G.). Sept. 10, 1934. 430,130.

DYEING WOOL.—I. G. Farbenindustrie. Sept. 30, 1933. 430,287.

DESTRUCTIVE HYDROGENATION of carbonaceous materials.—International Hydrogenation Patents Co., Ltd. Nov. 11, 1933. 430,069.

CONDENSATION PRODUCTS, preparation.—Soc. Nobel Française. Oct. 20, 1933. 430,136.

AZO DYESTUFFS, manufacture.—M. J. G. Bader. Dec. 12, 1933. 430,222.

Applications for Patents

(June 20 to 26 inclusive.)

POLYMERISATION OF GASEOUS OLEFINES.—Anglo-Persian Oil Co., Ltd., and A. E. Dunstan. 18296.

BERYLLIUM ALLOYS, manufacture.—Beryllium Corporation. (United States, June 26, '34.) 17983.

REDUCTION OF MOLYBDENUM, ETC.—P. E. Billinghurst. 17825.

DISINFECTION FOR PESTS.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 18318.

STABILISATION OF VINYL RESINS.—Carbide and Carbon Chemicals Corporation. (United States, July 10, '34.) 18154.

COPPER PHTHALOCYANINES, manufacture.—A. Carpmael (I. G. Farbenindustrie). 17778.

PROCESS FOR IMPROVING FASTNESS OF DYEINGS to washing.—A. Carpmael (I. G. Farbenindustrie). 18095.

WATER INSOLUBLE AZO DYESTUFFS, manufacture.—A. Carpmael (I. G. Farbenindustrie). 18172.

VITAMIN PREPARATIONS, manufacture.—A. Carpmael (I. G. Farbenindustrie). 18173.

PROCESS FOR AFTER-TREATMENT of condensation products.—A. Carpmael (I. G. Farbenindustrie). 18273.

COLOUR CONCENTRATES.—F. B. Dehn (Neumann Research, Inc.). 17894.

CALCIUM SULPHATE PLASTERS.—J. S. Dunn, F. R. Himsworth, Imperial Chemical Industries, Ltd., and V. Lefebure. 17763, 18108.

DIALKYL GLYCOLS, manufacture.—E. I. du Pont de Nemours and Co. and V. L. Hansley. 17764, 17765.

CHITIN COMPOUNDS.—E. I. du Pont de Nemours and Co. (United States, July 13, '34.) 17990.

SYNTHETIC RESINS, manufacture.—E. I. du Pont de Nemours and Co. (United States, July 13, '34.) 18339.

N-SUBSTITUTED AMIDES OF PYRIDINE CARBOXYLIC ACIDS, production.—K. Fricker (Germany, Aug. 4, '34.) 18293.

IMPARTING HYDROPHOBIA PROPERTIES to cellulose fibres.—W. W. Groves (I. G. Farbenindustrie). 17898.

ANHYDRITE PLASTERS, manufacture.—F. R. Himsworth, Imperial Chemical Industries, Ltd., and V. Lefebure. 18338.

APPARATUS FOR EMULSIFICATION.—T. Hogg. 18145, 18295.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. (Nov. 24, '34.) (Germany, Nov. 25, '33.) 17999.

LIQUID HYDROCARBONS, production.—International Hydrogenation Patents Co. (Germany, July 7, '34.) 18155.

ORGANIC COMPOUNDS, manufacture.—R. G. Israel, and H. P. Stephenson. 18105.

CONVERSION PRODUCTS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 17864.

SYNTHETIC TANNING AGENTS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 17971.

DYESTUFF COMPOSITIONS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 18303.

SUPER-PHOSPHATES, ETC., manufacture.—R. Moritz. (France, June 20, '34.) 17804.

PROCESS FOR REMOVAL OF PHENOLS from waste waters.—H. E. Potts (International Hydrogenation Patents Co.). 18015.

POLYHYDRIC ALCOHOL-POLYBASIC ACID RESIN, production.—I. Rosenblum. (United States, June 27, '34.) 17886.

HYDROAROMATIC SULPHURIC ACID DERIVATIVES, manufacture.—W. J. Tennant (Henkel and Cie.) 18340.

From Week to Week

AN INDEX TO VOLUME XXXII of THE CHEMICAL AGE is published with this issue. It will be found inside the back cover, whence it can readily be detached for binding purposes.

THE NAME OF TUNNEL REFINERIES, LTD., 5 Idol Lane, London, E.C.3, has been changed to Tunnel Glucose Refineries, Ltd.

THE LIBRARY OF THE CHEMICAL SOCIETY will be closed for stocktaking from Monday, August 5, until Saturday, August 17 inclusive, and will close each evening at 5 o'clock from August 19 until September 14.

THE EMPIRE PARLIAMENTARY DELEGATES were the guests of Sir Harry McGowan and the directors of Imperial Chemical Industries Ltd., at luncheon at Imperial Chemical House, on Thursday.

A NEW LINING AND KIP SIDE FACTORY is being established by a well-known English firm in the Irish Free State. Several firms in the Northampton district are providing extensions or special building for the application of cellulose finishes, so that the demand for these seems likely to increase. Most chrome leather manufacturers are experiencing a very busy time in spite of larger imports from Germany.

THE INVITATION OF THE INSTITUTION OF CHEMICAL ENGINEERS to the American Institute of Chemical Engineers to visit this country at the time of the Chemical Engineering Congress has been accepted. Details of the arrangements are now being worked out by a special committee appointed by the council. It is possible that a general meeting of the American Institute will form part of the programme.

FIVE COOLERS were given to the Ditton Laboratory of the Department of Scientific and Industrial Research on July 5, in acknowledgment of the department's work for the home fruit-growing industry, especially in the discovery and development of the new process of "gas-storage." The coolers will be added to the laboratory's experimental refrigerated chambers. Three were given by Mr. S. W. Mount, of Patricksbourne, Canterbury, on behalf of a number of fruit-growers, and two by Lord Dudley Gordon, on behalf of J. and E. Hall, Ltd., refrigerating engineers, of Dartford, by whom the coolers were designed and made. Sir Frank Smith, secretary of the department, said the new equipment would enable them to make more rapid progress with their work. He explained that while English apples are perhaps the finest in the world, they do not do so well in cold storage as those from some other parts of the world. Though certain varieties may be cold-stored for some months, they are liable to rapid wastage on removal from store. Fortunately the department has been able to find a solution of this difficulty—in "gas-storage."

LONDON REFINERS, LTD., have increased their nominal capital by the addition of £10,000 in £1 ordinary shares beyond the registered capital of £10,000.

THE MELCHETT COURT ESTATE, Romsey, covering about 1,200 acres, for many years the home of the late Lord Melchett, was sold last week for £29,500.

THE PROSPECTS OF A SHALE OIL INDUSTRY being started at Conon Bridge in Ross-shire, several miles north of Inverness, are brighter as the result of a recent visit of experts from the Anglo-Iranian Oil Co. The ground on which oil shale has been found is on the farm of Capt. M'Intyre, St. Martin's. Boring will be started at an early date.

AGITATION FOR BETTER CONDITIONS among workers engaged in the aluminium producing industry is to be renewed. A request was made a month ago by the National Union of General and Municipal Workers for the setting up of a Trade Board in view of the level of wages and conditions prevailing in this industry. It has now been decided to ventilate the claims of the Union in the House of Commons, and a question is to be tabled at an early date.

AFTER LENGTHY DISCUSSIONS, the International Nitrate Conference at Scheveningen, Holland, has come to an end, and it was officially announced afterwards that an agreement in principle had been reached between the European producers. The Nitrate Convention expired on June 30, and the European producers have been endeavouring to reach an agreement among themselves before a decisive conference is held for the conclusion of a new convention.

IN THE CHANCERY DIVISION on July 8, Mr. Justice Eve heard a petition by Cheshire United Salt Co., Ltd., for confirmation of a proposed reduction of its capital from £125,000 to £62,500. Mr. Cecil Turner, for the company, said there was only one class of shares, and it was proposed to reduce them from 2s. to 1s. each. The petition was adjourned for a week on the understanding that, if either side desires to cross-examine the deponents, a further application should be made to fix another date for the hearing.

EMPLOYERS IN THE BLEACHING, dyeing and finishing section of the textile industry on July 9 decided to post notices in all their works informing the 80,000 workpeople that they would be held responsible for damages for breach of contract unless they give individually seven days' strike notice. This development follows on the communication sent by the employers to Mr. Arthur Shaw, secretary of the Federated Trade Unions, in which the employers' committee states that it does not recognise the strike notices handed in. The dispute has arisen through the trade unions asking for wages increases.

THE MANCHESTER REGIONAL SMOKE ABATEMENT COMMITTEE has drafted a scheme for a proposed South-East Lancashire Joint Smoke Abatement Board, and, at a meeting held in the city, it was approved in principle. The scheme has now to be submitted to the local authorities and makes provision for a joint board which would subdivide the area concerned into fifteen inspectorial districts on the basis of the number of industrial chimneys. The committee states that scientific methods have enabled a cotton mill to reduce its coal consumption from 75 to 60 tons per week, and a chemical works by £10 per week.

THE AUTUMN MEETING of the Iron and Steel Institute will be held at Manchester, September 16 to 19. A reception committee, representing the iron, steel and engineering industries of Manchester and Lancashire, has been formed, and of this the Earl of Crawford and Balcarres is president, with Mr. J. E. James as chairman. The committee includes representatives of works on the Cumberland coast to which invitations to pay visits have been received. By kind permission of the United Steel Companies, Ltd., and the Millom and Askam Hematite Iron Co., Ltd., members will visit the works at Moss Bay and at Millom.

THE BRITISH STANDARDS INSTITUTION has received a request from the British Plastics Federation, Ltd., to consider the preparation of a British Standard Specification for synthetic moulding materials and moulded articles for general purposes. In accordance with the usual practice of the Institution a conference of all interests concerned is being convened to ascertain whether there is a consensus of opinion favourable to the work being undertaken, and that it is to fulfil a generally recognised want. The conference will be held on Wednesday, July 17, and should it be in favour of the work proceeding, then a committee will at once be formed. Should the conference not be in favour, no further action will be taken. Further information regarding the proposed conference can be obtained by application to the Director of the British Standards Institution, 28 Victoria Street, S.W.1.

Company News

Michael Nairn & Greenwich.—The payment of an interim dividend of 5 per cent. is announced. This rate has been maintained for some years, and in each case has been followed by a final dividend of 7½ per cent.

Standard Chemical Co.—The report for the year ended March 31, 1935, states that profits from operations were $19,806; deduct reserves for depreciation of plants $17,500 and $346 for income-tax, leaving profit $1,960, an improvement of $138,652. Sales reached $1,302,193, an increase of $127,430.

Bell Brothers (Manchester 1927).—A trading loss to March 31, of £4,671 is reported against £986 last year, plus depreciation and directors' fees £3,481. After deducting interest on investment £240, there is a debit balance of £7,912; add debit balance brought in £5,044, leaving debit to be carried forward £12,956.

Distillers, Ltd.—The report for the year to May 15 last shows that profits amounted to £2,112,133, after providing for superannuation, etc. For the previous year the profit was £2,040,622. The ordinary dividend is maintained at 20 per cent. and the reserve transfer increased from £250,000 to £350,000.

Lovering China Clays.—For the year to March 31 last receipts from dividends and interest rose from £6,327 to £10,912. After including other revenue and making provision for debenture interest and sinking fund and tax, etc. there is a loss of £8,392, compared with £12,312, which increases the debit balance forward to £49,470.

W. and T. Avery, Ltd.—The net profits for the year to March 31 last show an expansion of over £20,000 at the record figure of £124,087. The ordinary share dividend is maintained at 15 per cent. for the year, with a final dividend of 10 per cent. Reserve receives £30,000, against £10,000, and £60,483 is carried forward, against £59,590.

Buell Combustion.—The report for 1934 states that there was a net loss for the year of £16,205, increasing debit to £39,990. It is stated that sales are on an increasing scale, and it is anticipated that as the company's business becomes more firmly established these will continue to improve. Formation of the company to manufacture and market the company's equipment in U.S. has been completed and operations commenced. Research work on new type of pulverising system has produced satisfactory results, and important negotiations are pending in connection with marketing arrangements.

Cellulose Acetate Silk Co.—The report for the period from April 1, 1934, to March 30, 1935, states that the profit on trading during the year was £42,405, which together with interest receivable and transfer fees amounted to £44,435. After charging directors' fees, depreciation and expenses, amounting in all to £58,017, a net loss of £13,582 was incurred. Deducting this figure from the credit balance of £56,009 brought forward, after transferring £10,000 to reserve for contingencies, there remains a balance of £42,427, to be carried forward. For the previous period from April 2, 1933, to March 31, 1934, the trading profit was £150,453, and with interest, fees, etc., the total was £153,986. Net profit after fees, depreciation, etc., was £97,175.

Books Received

The Fundamentals of Chemical Thermodynamics. By J. A. V. Butler. London: MacMillan and Co., Ltd. Pp. 253. 7s. 6d.

Practical Hints on Patents. By M. E. J. Gheury de Bray. London: The Imperial Patent Service. Pp. 48. 1s.

The Chemical Formulary. Vol. I and II. Editor-in-Chief, H. Bennett. London: Chapman & Hall. Pp. 596. 25s. each.

Kuster-Thiel Logarithmische Rechentafeln fur Chemiker. Berlin: Walter de Gruyter & Co. Pp. 216. RM.6.80.

Standard Methods for Testing Petroleum and Its Products. London: Institution of Petroleum Technologists. Pp. 228. 7s. 6d.

Handbook on Offensive Trades. By David Ronald. London: William Hodge & Co., Ltd. Pp. 204. 15s.

Limestone and Its Products. By Alfred B. Searle. London: Ernest Benn, Ltd. Pp. 709. 42s.

Chemical Guide Book, 1935. New York: Chemical Markets. Pp. 800.

F.B.I. Register of British Manufacturers. 1935-36. London: Federation of British Industries. Pp. 522.

Organic Syntheses. London: Chapman & Hall, Ltd. Pp. 104. 8s. 6d.

Textbook of Quantitative Analysis. By William Thomas Hall. London: Chapman & Hall, Ltd. Pp. 350. 15s.

Annual Report of the Birmingham City Analyst for the Year 1934. By H. H. Bagnall.

Official Publications

Report of the Chemistry Research Board for the period ended December 31, 1934. Department of Scientific and Industrial Research. London: H.M. Stationery Office. Pp. 94. 1s. 6d.

The Hydrogenation-Cracking of Tars. Part I.—Preliminary Experiments. Pp. 108. 2s. Part II.—The Preparation of a Catalyst. Pp. 18. 6d. London: H.M. Stationery Office.

Economic Conditions in Spain. February, 1935. By Alexander Adams. Department of Overseas Trade. London: H.M. Stationery Office. Pp. 36. 1s. 6d.

Annual Report on Alkali, etc. Works. London: H.M. Stationery Office. Pp. 44. 9d.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—H.M. Trade Commissioner at Calcutta reports that the Indian Stores Department is calling for tenders, to be presented in India by July 29, for the supply of chloride of lime. (Ref. T.Y.8.)

British India.—H.M. Trade Commissioner at Calcutta reports that the Indian Stores Department is calling for tenders, to be presented in India by July 22, 1935, for the supply of salammoniac. (Ref. T.Y.7.)

Siam.—H.M. Consul-General at Bangkok reports that the Royal State Railways of Siam are calling for tenders, to be presented in Bangkok, Siam, by August 12, for the supply of 1,000 five gallon drums of black bituminous solution. Firms desirous of offering bituminous solution of United Kingdom manufacture can obtain the further details of this call for tenders, together with particulars of the "Special Register" service of information, upon application to the Department of Overseas Trade, 35 Old Queen Street, S.W.1. (Ref. T.Y.15.)

New Companies Registered

Amalgamated Oxides, Ltd.—Registered June 11. Nominal capital £360,000 in 126,274 5 per cent. redeemable non-cumulative preference shares of £1, and 467,452 ordinary shares of 10s. To acquire part of the undertakings of the N.C. Metal Co., Ltd., and H. Edwin Coley, Ltd., and the whole undertakings of the Zinc Manufacturing Co., Ltd., and the Metallic Ore Reduction Co., Ltd., to manufacture and deal in zinc, zinc oxide and other zinc products, tin and other metals, minerals and ores. Directors: Samuel C. E. Lloyd, The Nunnery, Penshurst, Kent; Sir Geo. Roberts, Bt., K. D. R. Morrice, W. F. C. McClure, J. C. Lloyd, W. Stewart, and P. Still.

Avis Fertilizer Co., Ltd., 304 Edgware Road, London, W.—Registered June 29. Nominal capital £500. Manufacturers of and dealers in manures and fertilisers of all kinds, chemists, etc. Directors: Geo. F. W. Cobbold and Alfred F. B. J. Wilcocks.

Barbet, Ltd.—Registered July 2. Nominal capital £2,000. Manufacturers of and dealers in stills and other apparatus for distillation, rectification, evaporation, carbonisation, extraction and treatment of alcohol and all chemical products, engineers, coppersmiths, etc. A subscriber: Marcel Semet, 14 Palmer Street, London, S.W.1.

Cement Patents, Ltd., 26-8 Billiter Street, London, E.C.3.—Registered June 14. Nominal capital £100. To acquire licences or rights in respect of and turn to account wet or dry carbonising processes, processes for heating or drying, or for expelling or re-

moving water and moisture, etc. Directors: Geo. G. Young, Wm. Young, Harold W. Ibbott, Arthur P. Ibbott.

Dr. Blagden's Proprietary, Ltd., 125 Pall Mall, London, S.W.1. —Registered June 12. Nominal capital £100. Chemists, druggists, manufacturers of and dealers in pharmaceutical and other preparations, etc.

Electro-Alloys, Ltd.—Registered June 24. Nominal capital £10,000. To carry on the business of manufacturing and treating by electrolytic, chemical and other means, tungsten, molybdenum and other metals and substances and the products and compounds thereof, etc., and to adopt an agreement with M. A. Halle and Co., Ltd., and Max. A. Halle. Directors: Ludwig Goldschmidt, 54 Victoria Street, S.W.1, Max. A. Halle and R. M. Postlethwaite.

Eldu Products, Ltd., 125-7 Euston Road, London, N.W.1.—Registered July 1. Nominal capital £500. Wholesale, retail and manufacturing chemists and druggists, etc. Directors: Woolf Duman, Wilhelm Woolff.

J. C. Eno (S.E.), Ltd.—Registered in Dublin as a private company on June 11. Nominal capital £6,000. The objects are to manufacture and deal in, in Saorstat Eireann, the preparation known as "Fruit Salt," "Eno's Fruit Salt," or "Eno," etc. A subscriber: Percy H. Harwood, Belmont House, Bray, Co. Wicklow.

Industrial Gases (I.F.S.), Ltd.—Registered in Dublin as a public company on June 25. Nominal capital £30,000. Manufacturing, compressing, and dealing in oxygen, acetylene, hydrogen, nitrogen, carbonic acid and other gases, carbide of calcium, etc. Directors: Percy B. Liversidge, Stonegarth, George Road, Kingston Hill, Surrey, Charles A. Dunbar, Robert B. Scribner, James Moran, David Frame, Thomas Buchanan.

Ingram Thompson and Sons, Ltd., 7 Rumford Street, Liverpool. —Registered June 18. Nominal capital £7,000. To acquire the business now carried on at 7 Rumford Street, Liverpool, and at Marston and Wincham, Ches., as "Ingram Thompson and Sons," and to carry on the business of salt proprietors, manufacturers of and dealers in salt and other chemical products, etc. Directors are: Henry Ingram Thompson, John Ingram Thompson, Alan Kinsey Thompson.

International Nitrogen Association, Ltd., 85 London Wall, London, E.C.2.—Registered June 19. Nominal capital £1,000. Dealers in nitrates and chemical products, etc.

Lipton's Spray Products, Ltd., 150 Southampton Row, London, W.C.1.—Registered July 4. Nominal capital £1,500. To adopt an agreement with Leslie Lipton for the purchase of all his rights and interest in the business of a chemical manufacturer heretofore carried on by him as "Lipton's Germicide Products Co." Directors: Leslie Lipton, David M. Sherwood.

London Solvents, Ltd.—Registered July 1. Nominal capital £100,000. Manufacturers, distillers, refiners, wholesalers, retailers, importers and exporters of alcohol, spirits, acetic acid, aceto, butyl, ethyl, esters, methyl, petroleum, acids, salts, nitrates and chemical products for industrial, chemical, medicinal and other use; brewers, distillers, manufacturers of vinegar, beer, wines, spirits and liquors, etc. A subscriber: D. H. M. Stimson, 32 Christchurch Road, Streatham Hill, S.W.

Metal Extractions, Ltd., 54 Victoria Street, Westminster, S.W.1. —Registered June 11. Nominal capital £100 in £1 shares. Chemical, engineering, physical and scientific businesses, and especially the extraction of metals from their ores; and that of technical, industrial, wholesale, retail manufacturing, consulting and research chemists, miners, mine owners, mineral prospectors, and metallurgists, etc. Directors: Owen D. Lucas, 49 Linden Gardens, W.2, Christopher Pleydell-Bouverie, G. M. G. Wilshire, and V. Einstein.

Mount Pleasant Laboratories, Ltd., 133-134 Moorgate Station Chambers, London, E.C.2.—Registered June 17. Nominal capital £100. Agents for, dealers in and manufacturers of chemicals, drugs, medicines, pills, fertilisers, disinfectants, etc. Directors: Harry B. Newton, Thos. A. Redman, and Jean J. Juppe.

Pyrogas, Ltd., 29a Charing Cross Road, London, W.C.—Registered June 29. Nominal capital £1,000. To manufacture and sell, and to grant sub-licences to others to manufacture, sell and distribute an invented article described in a certain application made in America for letters patent for compound gaseous fuels, and to carry on the business of chemists, druggists, importers and manufacturers of and dealers in chemical combinations for the compound gaseous fuel, manufacturers of explosives, nitro glycerine, dynamite, etc. Directors: Chas. F. Carroll, Philemon A. Stilwell, Gerard T. Harris.

Scotia Iron and Chemical Co., Ltd., 36 New Broad Street, London, E.C.—Registered as a private company, on June 14. Nominal capital £1,000. To adopt an agreement with the Scottish Iron Corporation, Ltd., and to carry on the business of iron masters, steel makers and converters, colliery proprietors, coke manufacturers, engineers ironfounders, manufacturing chemists, carbolic acid manufacturers, etc.

J. W. Simpson (Chemist), Ltd., Aldwych House, Aldwych, London, W.C.2.—Registered June 28. Nominal capital £100. Wholesale and retail chemists and druggists, analytical and consulting chemists, chemical engineers, etc. Directors: James W. Simpson, Harry A. Poulton, Mrs. Margaret E. Palmer.

Scottish Peat Compound and Chemical Co., Ltd., 50 Ellesmere Street, Hulme, Manchester.—Registered June 27. Nominal capital £6,000. Manufacturers of and dealers in peat, fertilisers, artificial manures and chemical products, etc. Directors: Geo. W. Slack, Mendel Samuel, Samuel Samuel.

Tepalin, Ltd., 59 Mark Lane, London, E.C.3.—Registered June 29. Nominal capital £5,000. To adopt an agreement with Thornhill, Philp and Lehmann, Ltd., and Shuttleworth, Mellor and Co., Ltd., to acquire the trade mark "Tepalin," and the goodwill of the business in connection therewith, and to carry on the business of importers, exporters and manufacturers of and dealers in cleaners, detergents, water softeners and chemical product known, or to be known, as "Tepalin." Directors: Lt.-Col. Fdk. G. G. Bailey, Robert C. P. Philp, Chas. W. Thornhill, Arthur Lehmann, John U. T. Shuttleworth.

Union Alkali Company, Ltd., Soho Works, Ancoats, Manchester, 4.—Registered June 19. Nominal capital £6,000. Manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris, gypsum, plasters, disinfectants, fertilisers, salts, acids, etc. Directors: James Marsh, James Marsh, jun., Arthur M. Mercer.

Zanzibar Distillers, Ltd., 11 Hart Street, London, E.C.3.—Registered as a private company on June 17. Nominal capital £14,020. To acquire from the Zanzibar Government a licence to distil clove oil in the Protectorate of Zanzibar, to erect, maintain and work the distillery or distilleries necessary to operate the licence, and to carry on the business of producers, refiners, storers, suppliers and distributors of essential oils, and the products thereof, oil distillers and extractors, seed crushers, etc. Directors: Edward W. Bovill, Frederick G. Pentecost, Walter F. Jenkins, Denis A. J. Buxton.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ORR'S ZINC WHITE, LTD., London, E.C. (M., 13/7/35.) Reg. June 28. £60,000 deb. stock secured by Trust Deed dated June 25, 1935; general charge. *Nil. Oct. 12, 1934.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

PHILLI-MIRANO CO., LTD., 273 Union Street, Blackfriars, mfg. chemists. (C.C., 13/7/35.) £44 6s. 8d. June 4.

JOHN QUILLIAM AND CO. (1923), LTD., 15a Hagley Road, Five Ways, Birmingham, mfg. chemists. (C.C., 13/7/35.) £12 17s. 4d. May 29.

London Gazette, etc.

Companies Winding-up Voluntarily

N.C. ZINC OXIDE CO., LTD. (C.W.U.V., 13/7/35.) By special resolution June 28. Laurence Stanley Kinnear, Shell-Mex House, Victoria Embankment, London, W.C.2, appointed liquidator. Creditors' claims to Laurence Stanley Kinnear by July 19.

AGDEN SALT WORKS, LTD. (C.W.U.V., 13/7/35.) Creditors' debts or claims to Richard Caton de Zouche, 8 Cook Street, Liverpool 2, the liquidator of the company, by July 31.

Receivership

K. R. PLASTICS, LTD. (R., 13/7/35.) N. H. Keen, chartered accountant, 65/6, Chancery Lane, London, W.C., was appointed receiver and manager on June 26, 1935, under powers contained in debenture dated May 16, 1935.

Chemical and Allied Stocks and Shares

Current Quotations

THE following table shows this week's Stock Exchange quotations of chemical and allied stocks and shares compared with those of last week. Except where otherwise shown the shares are of £1 denomination.

Name.	July 9.	July 2.
Anglo-Iranian Oil Co., Ltd. Ord.	60/-	61/3
,, 8% Cum. Pref.	36/3	36/9
,, 9% Cum. Pref.	37/6	37/9
Associated Dyers and Cleaners, Ltd. Ord.	1/10½	1/10½
,, 6½% Cum. Pref.	4/8¼	4/8¼
Associated Portland Cement Manufacturers, Ltd. Ord.	53/6	55/-
,, 5½% Cum. Pref.	27/-	27/3
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	2/6	2/6
Berger (Lewis) & Sons, Ltd. Ord.	33/9	61/3
Bleachers' Association, Ltd. Ord.	6/-	6/3
,, 5½% Cum. Pref.	9/4½	8/9
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	21/3	21/3
Boots Pure Drug Co., Ltd. Ord. (5/-)	49/3	49/6
Borax Consolidated, Ltd. Pfd. Ord. (£)	95/-	97/6
,, Defd. Ord.	15/9	16/-
,, 5½% Cum. Pref. (£10)	£11/2/6	£11/2/6
,, 4½% Deb. (1st Mort.) Red. (£100)	£109	£109
,, 4½% 2nd Mort. Deb. Red. (£100)	£104	£103
Bradford Dyers' Association, Ltd. Ord.	9/4½	8/9
,, 5% Cum. Pref.	11/10½	11/10½
,, 4% 1st Mort Perp. Deb. (£100)	£84/10/-	£82/10/-
British Celanese, Ltd. 7% 1st Cum. Pref.	26/9	26/9
,, 7½% Part. 2nd Cum. Pref.	22/9	22/9
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	5/-	5/-
,, 4% 1st Mort. Deb. Red. (£100)	£91	£91
British Cyanides Co., Ltd. Ord. (2/-)	3/7½	3/7½
British Drug Houses, Ltd. Ord.	20/-	20/-
,, 5% Cum. Pref.	22/6	22/6
British Glues and Chemicals, Ltd. Ord. (4/-)	5/3	5/3
,, 8% Pref. (Cum. and Part.)	29/4½	30/-
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	48/9	48/9
,, 5½% Cum. Pref.	26/3	26/3
,, 4¼% First Mort. Deb. Red. (£100)	£107/10/-	£107/10/-
British Oxygen Co., Ltd. Ord.	115/-	111/3
,, 6½% Cum. Pref.	31/10½	31/10½
British Portland Cement Manufacturers, Ltd. Ord.	90/-	91/3
,, 6% Cum. Pref.	31/6	31/-
Bryant & May, Ltd. Pref.	67/6	67/6
Burt, Boulton & Haywood, Ltd. Ord.	20/-	20/-
,, 7% Cum. Pref.	27/6	27/6
,, 6% 1st Mort. Deb. Red. (£100)	£105/10/-	£105/10/-
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	105/-	105/-
,, 4% 1st Mort. Deb. Red. (£100)	£96/10/-	£96/10/-
Calico Printers' Association, Ltd. Ord.	11/3	11/3
,, 5% Pref. (Cum.)	17/6	17/6
Cellulose Acetate Silk Co., Ltd. Ord.	10/7½	12/-
,, Deferred (1/-)	1/7½	2/4½
Consett Iron Co., Ltd. Ord.	7/3	7/3
,, 8% Pref.	25/-	23/9
,, 6% First Deb. stock, Red. (£100)	£105/10/-	£105/10/-
Cooper, McDougall & Robertson, Ltd. Ord.	36/3	36/3
,, 7% Cum. Pref.	30/-	30/-
Courtaulds, Ltd. Ord.	59/-	59/3
,, 5% Cum.	26/10½	26/3
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref.	25/-	25/-
,, Cum. 6% Pref.	28/9	28/9
,, 6½% Cum. Pref.	28/9	28/9
,, 7½% "A" Cum. Pref.	30/7½	30/7½
Distillers Co., Ltd. Ord.	93/6	94/6
,, 6% Pref. Stock Cum.	31/3	32/-
Dorman Long & Co., Ltd. Ord.	19/-	19/-
,, Prefd. Ord.	20/-	21/6
,, 6¼% Non-Cum. 1st Pref.	21/6	21/10½
,, 8% Non-Cum. 2nd Pref.	18/9	20/-
,, 4% First Mort. Perp. Deb. (£100)	£102/10/-	£103
,, 5% 1st Mort. Red. Deb. (£100)	£104	£104
English Velvet & Cord Dyers' Association, Ltd. Ord.	5/-	4/4½
,, 5% Cum. Pref.	8/1½	8/1½
,, 4% First Mort. Deb. Red. (£100)	£65	£65
Fison, Packard & Prentice, Ltd. Ord.	38/9	38/9
,, 7% Non-Cum. Pref.	30/-	30/-
,, 4½% Debs. (Reg.) Red. (£100)	£106	£106
Gas Light & Coke Co. Ord.	28/-	28/-
,, 3½% Maximum Stock (£100)	£90/10/-	£88/10/-
,, 4% Consolidated Pref. Stock (£100)	£109/10/-	£108/10/-
,, 3% Consolidated Deb. Stock, Irred. (£100)	£90/10/-	£89/10/-
,, 5% Deb. Stock, Red. (£100)	£113/10/-	£115/10/-
,, 4½% Red. Deb. Stock (1960-65) (£100)	£113/10/-	£111/10/-
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	12/6	12/6
,, 7% Prefd. Ord. (10/-)	13/1½	13/1½
,, 7% Cum. Pref.	30/-	28/9
Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref.	24/4½	24/4½
,, 6½% Cum. Pref.	28/9	28/9
Imperial Chemical Industries, Ltd. Ord.	35/3	36/3
,, Deferred (10/-)	8/6	8/9
,, 7% Cum. Pref.	33/6	33/6
Imperial Smelting Corporation, Ltd. Ord.	13/9	13/9
,, 6% Pref. (Cum.)	23/9	23/9
International Nickel Co. of Canada, Ltd. Cum.	$26\frac{3}{4}$	$27\frac{3}{8}$
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	95/-	95/-
,, 4% Mort. Deb. Red. (£100)	£98/10/-	£98/10/-
Laporte, B., Ltd. Ord.	107/6	107/6
Lawes Chemical Manure Co., Ltd. Ord. (1/-)	5/7½	5/7½
,, 7% Non-Cum. Part Pref. (10/-)	10/-	10/-
Lever Bros. Ltd. 7% Cum. Pref.	32/6	32/6
,, 8% Cum. "A" Pref.	32/9	32/9
,, 20% Cum. Prefd. Ord.	79/4½	79/4½
,, 5% Cons. Deb. (£100)	£109/10/-	£109/10/-
,, 4% Cons. Deb. (£100)	£105	£105
Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-)	1/3	1/3
,, 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st Debs. (Reg.)	£58	£58
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, 7½% Cum. Pref.	1/6¾	1/10½
Pinchin, Johnson & Co., Ltd. Ord. (10/-)	42/6	44/-
,, 7% Cum. Pref.	33/1½	33/1½
Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd.	£69	£69
Reckitt & Sons, Ltd. Ord.	114/4½	113/9
,, 4½% Cum. 1st Pref.	25/-	25/-
Salt Union, Ltd. Ord.	41/3	41/3
,, Pref.	46/3	46/3
,, 4½ Deb. (£100)	£109/10/-	£109/10/-
South Metropolitan Gas Co., Ord. (£100)	£125/10/-	£125/10/-
,, 6% Irred. Pref. (£100)	£149/10/-	£149/10/-
,, 4% Pref. (Irred.) (£100)	£106/10/-	£106/10/-
,, Perpetual 3% Deb. (£100)	£88/10/-	£88/10/-
,, 5% Red. Deb. 1950-60 (£100)	£113/10/-	£115/10/-
Staveley Coal & Iron Co., Ltd. Ord.	44/4½	44/4½
Stevenson & Howell, Ltd., 6¼% Cum. Pref.	26/3	26/3
Triplex Safety Glass Co., Ltd. Ord. (10/-)	68/1½	70/-
Unilever, Ltd. Ord.	33/1½	28/9
,, 7% Cum. Pref.	29/9	30/7½
United Glass Bottle Manufacturers, Ltd. Ord.	41/-	42/-
,, 7½% Cum. Pref.	33/-	33/-
United Molasses Co., Ltd. Ord. (6/8)	20/-	20/7½
,, 6% Cum. Pref.	25/-	25/-
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	6/6	7/-
,, 7% Cum. Pref.	23/9	23/9
,, 6% Deb. Red. (£100)	£101	£101